JUNE 17, 1957
20 CENTS

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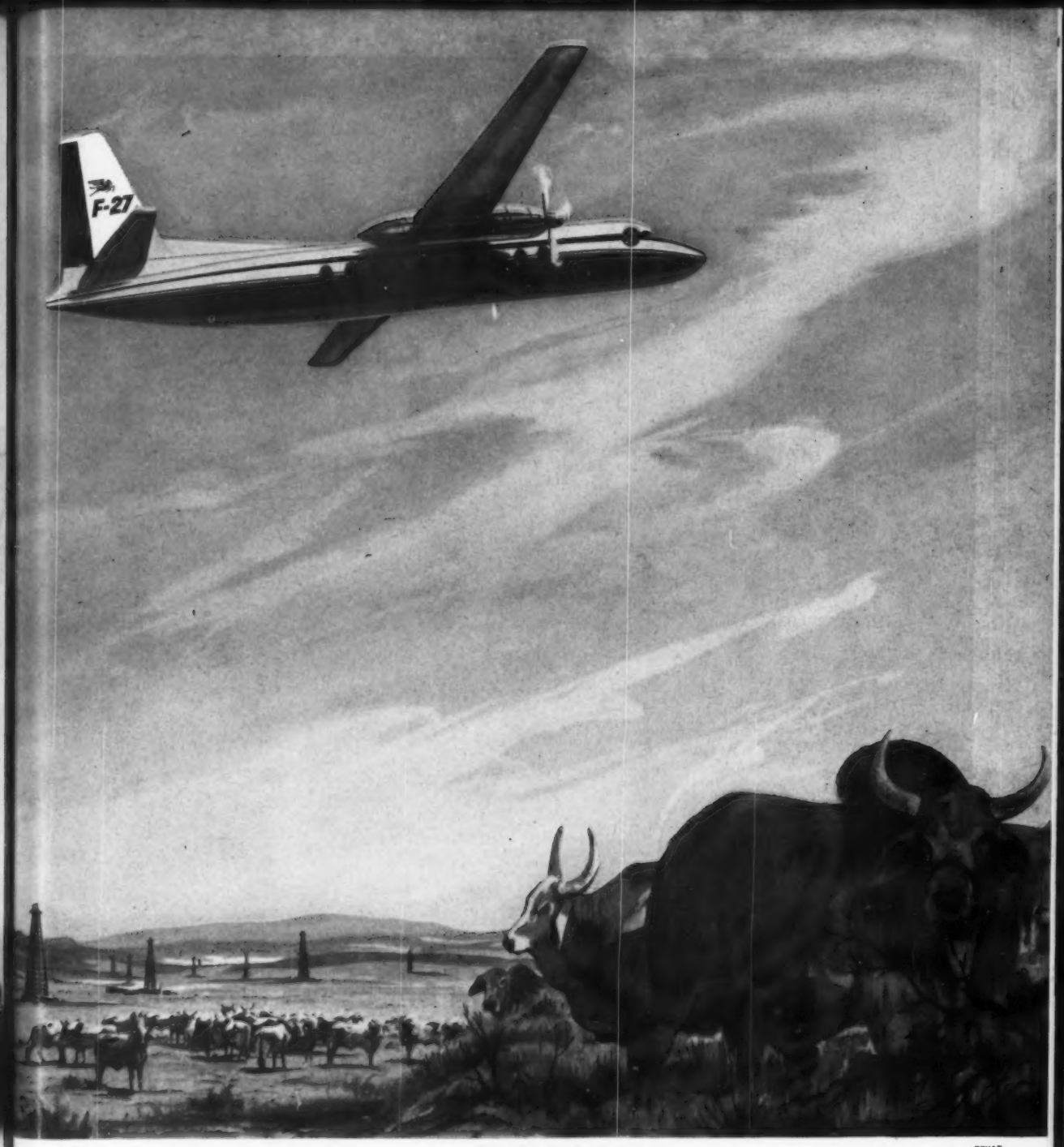

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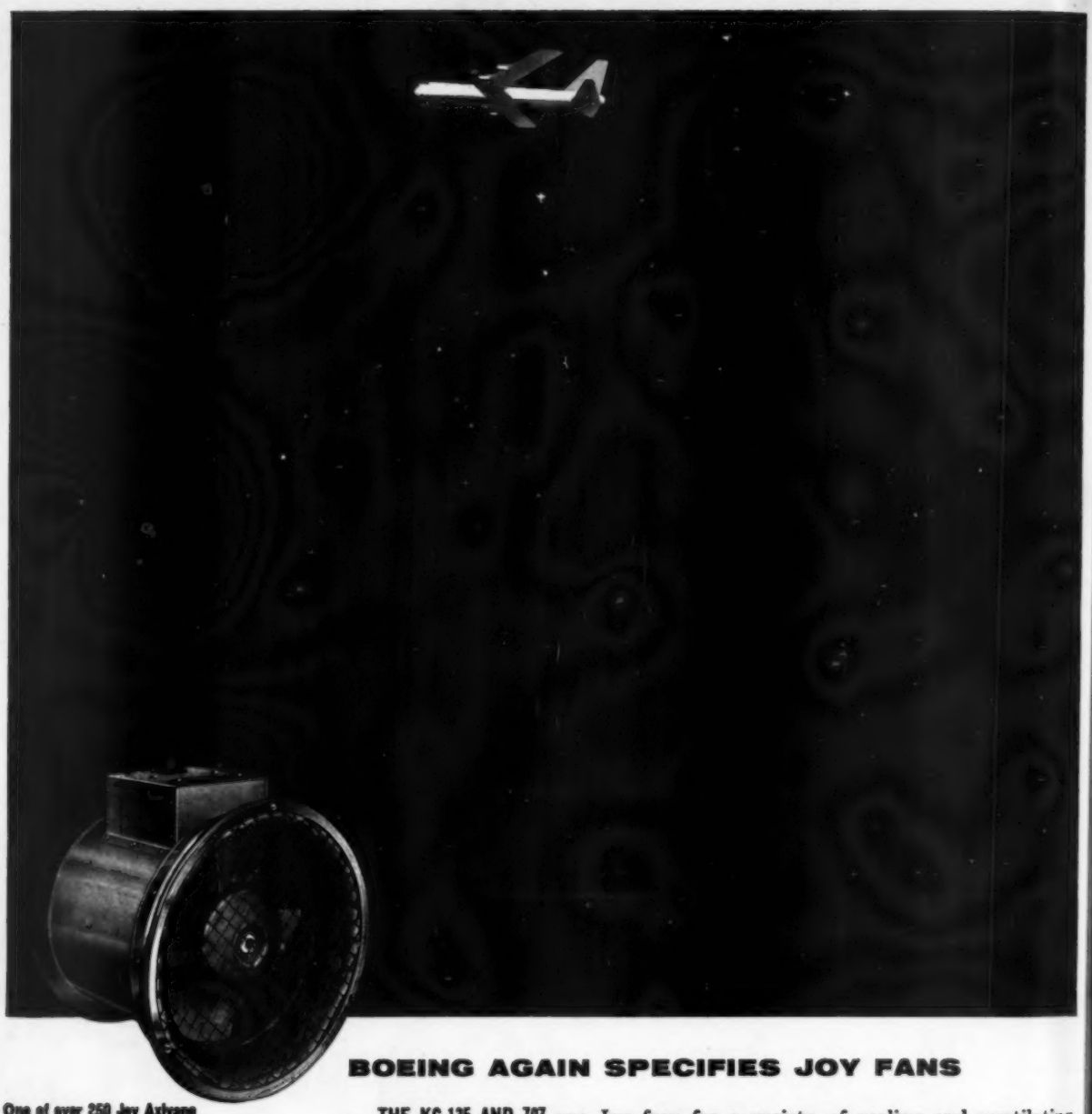

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BPA NBP

JUNE 17, 1957—VOL. 21, NO. 2

AMERICAN AVIATION

WORLD'S LARGEST AVIATION PUBLISHERS

Aircraft buying curbs run into heavy fire

AF protagonist Sen. Symington charges administration is tailoring weapons requirements to balance budget. Pentagon comptroller McNeil defends Wilson decrees. See page 41.

U.S. displays dominate Paris air show

But there were plenty of exhibits from other countries, including those behind the Iron Curtain. For full report of what went on see page 47.

How to parlay $3,000 into big business

William Moog was pushed into production of a servo valve that he couldn't get anyone else to manufacture. His company's sales this year: $10 million. See page 53.

C-82 gets a boost from small turbojets

Steward-Davis mounted a twin-jet pack atop the Packet to anwer marginal single-engine performance of the twin-boom cargo aircraft. See page 90.

Contents

PHOTO CREDITS

Dept. of Defense, p. 16; Wide World, p. 41; U.S. Army, p. 41; Oubre, pp. 53, 56; Chrysler, p. 59; Rene St. Paul, p. 61; Tierney & Killingsworth, p. 70; Douglas, p. 85; Dick Saunders, p. 89; Lewis Shepard, p. 93; George A. Beamish, p. 101; De Havilland, p. 102; Ankers, p. 112.

63,700 Copies of This Issue Printed.

How good is Russia's Tu-104 jet transport? . . . Look for the answer in a personal report by international editor Anthony Vandyk in the next issue of AMERICAN AVIATION. Vandyk's appraisal of the Soviet jet in scheduled service is based on a roundtrip flight via Aeroflot between Prague and Moscow and personal interviews in both cities. Also . . . first specific information on the Tu-104's powerplant, heretofore shrouded in secrecy.

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First choice with more than 40 airlines, the Pacitron system makes possible additional important functions of fuel *management* and control, including automatic center of gravity control of fuel weight distribution, low level switching through thermistor level switches and automatic load limit control in accordance with the flight plan.

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PERSONAL VIEW

A National Disgrace

IF EVER A good argument existed against federal ownership and operation of anything, take a look at Washington National Airport serving the nation's capital.

Opened in 1938 as a model federal development, designed and built by CAA with the sponsorship of the late President Roosevelt, the terminal soon became inadequate and has endured painful patchwork extensions ever since.

This is not to say that local politics don't often snarl up airport programs, but no local politics could snafu anything more than the tedious procedures necessary to get funds for improvements by way of the CAA and the Bureau of the Budget and the Department of Commerce and on through the tortures of the House and the Senate. It is ridiculous that a public utility type of operation, which an airport is today, has to go through the same motions as a major federal department to get needed working tools.

The parking situation is incredible. We have no idea who is responsible, but we've heard nothing but alibis for years about a simple little matter like adequate parking space now occupied by a pleasant green lawn and monumental flag pole. Alibis and buck-passing. A city council or an airport authority would have had the job done ages ago.

But the major problem ahead is jets. Washington National is inadequate. It was back in the days of Don Nyrop as CAA Administrator when the proposed Burke Airport site was finalized. Yet today, with jets only a couple of years away, nothing has been done.

The reason is pretty obvious. It is a federal project. Nobody plays politics with more deftness than a Senator or Congressman with selfish interests at stake. Notable in the picture is Senator John Butler of Maryland, who seems determined that the capital of the United States shall not have an airport capable of being serviced by jets. But the Maryland Senator is only one of many who are sacrificing public service on the rather smoky altar of politics.

What began as a model federal project, something to lead the nation, has become a sodden political mess, a stepchild beholden to no responsible local agency. The moral is most certainly never to let the federal government engage in businesslike ventures that belong locally. It will be a miracle if the national capital has jet transport service when the jets are ready to go into use nationally.

Retirements

TWO MEN WHO can lay claim to two of the longest records of service in the aviation industry announced their retirements within a few days of each other late in May.

Paul H. Brattain, retiring as first vice president of Eastern Air Lines after 23 years with that company, began his aviation career 33 years ago in 1934 when he became manager of the Washington office of the old Aeronautical Chamber of Commerce. Brattain's contributions to the development of aviation in the U.S. are legion. In a personal way we are sorry to see him retire; he has been a firm and fine friend.

Hainer Hinshaw's record dates back 32 years when he became assistant to the president of the old Robertson Aircraft Company. He joined United Air Lines 25 years ago and has been assistant to the president of that airline for many years. Year after year Hinshaw has battled (successfully) encroaching and insidious state legislation designed to milk the air transport industry.

It is a sign of the industry growth when pioneers begin to retire. But industry will be the poorer for the absence of their background and counsel. They knew it when the struggle was tough.

Bouquet: Happy 25th

THE ANNOUNCEMENT OF the 25th anniversary of Beech Aircraft Corporation was so neat, formal and perfunctory. Nothing sensational, just a natural anniversary.

But what a story lies behind the birthday! Remember 1932, the year when the late Walter Beech first opened up shop out in Wichita? If you're too young to remember, let us remind you that times were tough, the aviation business was puny and struggling, and aviation folk lived on hamburgers whenever there was a nickel available for same.

There were few survivors of those days 25 years ago, especially in the civil field. But tough, gruff Walter Beech and his capable wife Olive Ann —who now heads the firm—did manage to survive and today Beech Aircraft is a proud, large, respected builder of business aircraft on a permanent foundation. It took a lot of conviction, faith and sacrificing to get there. But Beech succeeded. And the world is the better for it.

Wayne W. Parrish

SAC Silver Jubilee Newsreel

BY JACK PATTON

AC, Aeroquip Corp., A. P. Parts Co., Bendix Products Div., B. F. Goodrich, Delco-Remy, Eclipse-Pioneer, Glidden Co., Gould Nat'l Batteries, Grimes Mfg. Co.

Introducing new products and new ideas to fixed base operators throughout the southwest, SAC's famous "Flying Salesmen" covered the market in Luscombe Silvaires for several years after WW II. Here, VP Paul Kennedy (in plane) briefs a 1947 sales mission for his young pioneers in aviation distribution.

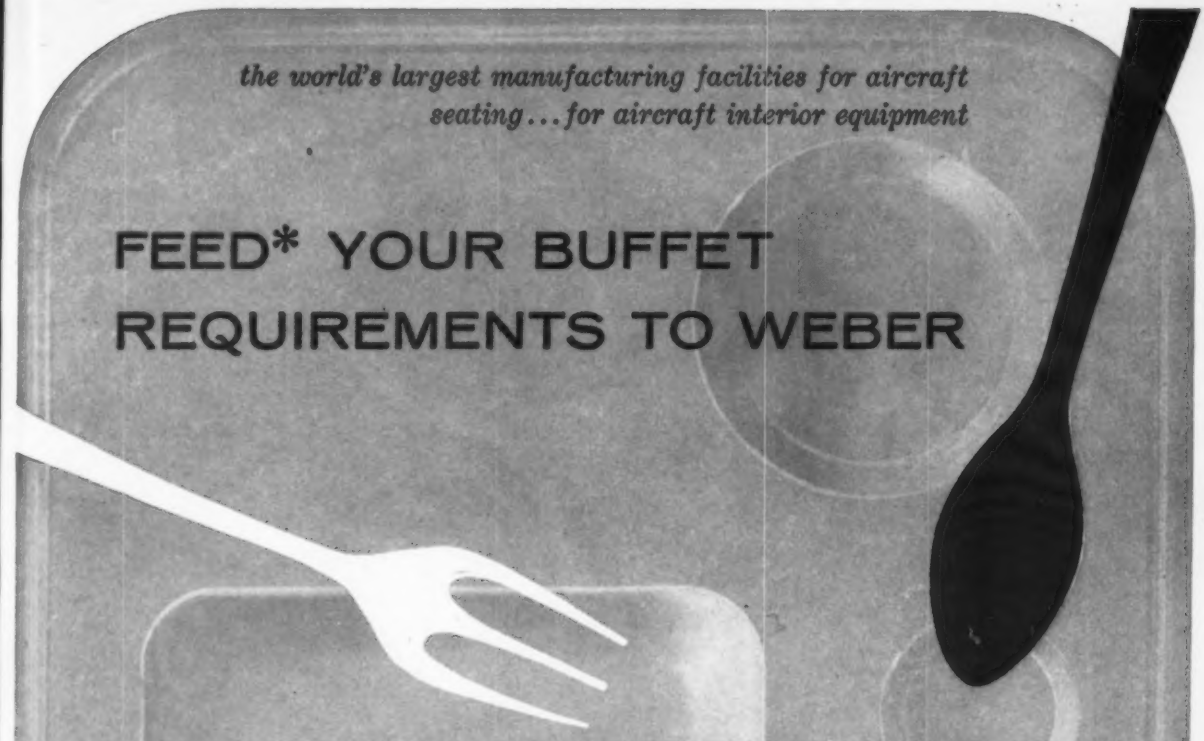
Hamilton Standard, Lycoming, MacWhyte Cable Co., Montrose Div. (Bendix), New York Air Brake, Pacific Div. (Bendix), Packard Electric, Pesco

In close harness with manufacturers, George Jalonick works to further improve his "services of supply" to airlines and overhaul firms. At immediate right, Sales Mgr. Don Morse of Bendix Scintilla (standing, left) joins him to check SAC's Scintilla inventory records. The other photo shows Jalonick receiving the Dallas Jaycee Wright Brothers Medal for community achievement.

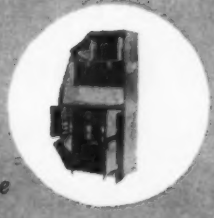
Pioneer Central Div. (Bendix), Pratt & Whitney Aircraft, Red Bank Div. (Bendix), Scintilla, Skinner Div. (Bendix), Utica Div. (Bendix), and Willard Batteries

the world's largest manufacturing facilities for aircraft seating... for aircraft interior equipment

FEED* YOUR BUFFET REQUIREMENTS TO WEBER



Behind the gleaming beauty of the modern Airline Buffet lie complexities that determine its efficiency. Quick reliable food heating, beverage cooling, ample storage capacity, easy operation, disposal facilities, and much, much more.



More... yes. For also behind every Weber buffet are design competence... weight-conscious engineering... efficient integrated facilities for quantity fabrication. Plus... the most reliable, longest established company in the field, daily staking its reputation on your lasting satisfaction.

No food-service-aloft problems need trouble you... feed them to Weber.

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FEED — to furnish the essential; to supply with cue-lines.

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That means increased periods between engine overhauls, because of less wear and tear on engine parts.

Gulf's Aircraft Engine Oil is the finest straight mineral oil you can choose—keeps engines as clean as any straight mineral oil can. But for the greatest possible cleanliness, buy Gulfpride Series D, the detergent oil.

Gulfpride Aviation Oil—Series D. Detergent Oil—for greatest possible cleanliness in radial, inline and horizontally opposed engines.

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GULF AVIATION PRODUCTS ...the world's finest aviation products

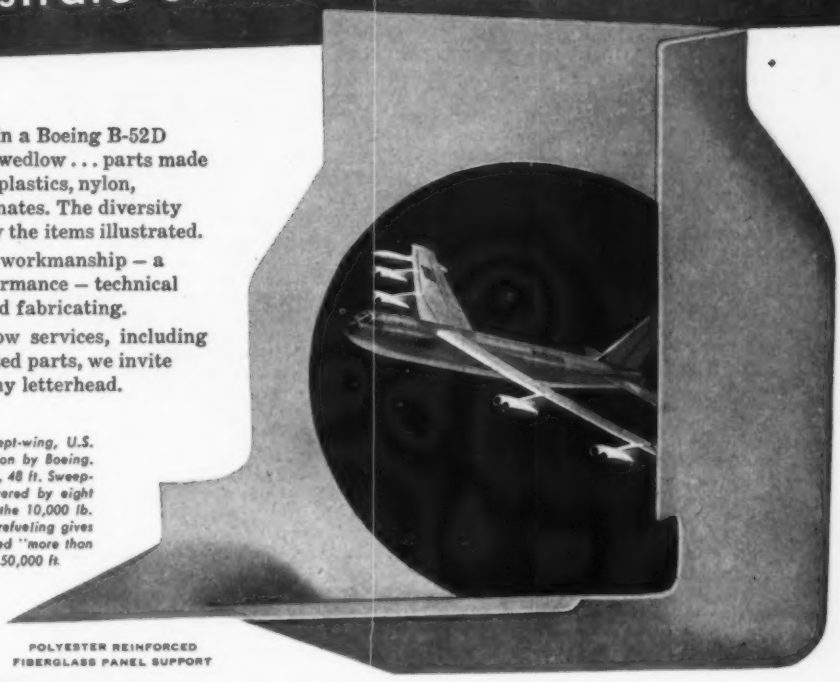
Fabricated plastic parts on Boeing B-52's demonstrate Swedlow versatility

Practically everywhere you look in a Boeing B-52D you see plastic parts built by Swedlow . . . parts made of laminated transparent acrylic plastics, nylon, heat-resistant, and fiberglass laminates. The diversity of shapes and sizes is indicated by the items illustrated.

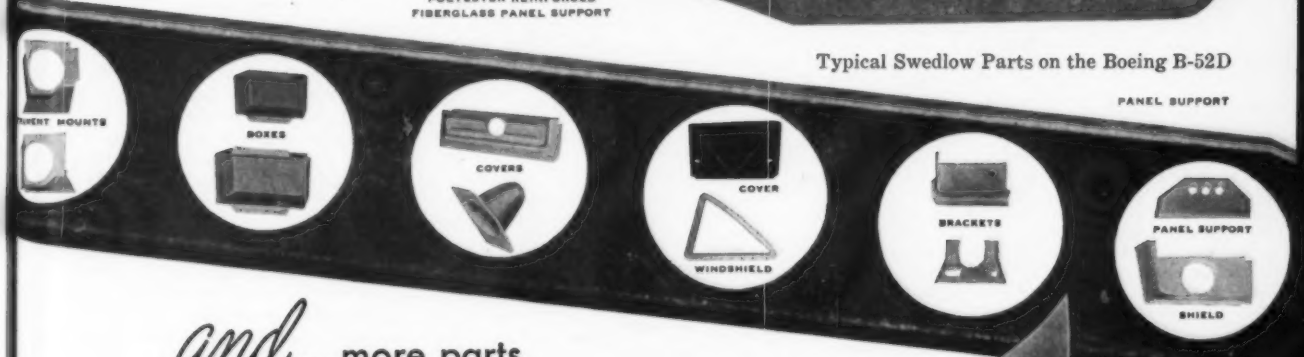
Swedlow offers you highest quality of workmanship – a reliable record of delivery performance – technical expertness in formulating and fabricating.

For complete information on Swedlow services, including new "honeycomb" cores and fabricated parts, we invite your inquiry on your company letterhead.

The Boeing B-52D Stratofortress is an eight-jet, swept-wing, U.S. Air Force long-range heavy bomber now in production by Boeing. Wing span, 185 ft. Overall length, 156 ft. Tail height, 48 ft. Sweepback, 35 deg. Gross weight, over 400,000 lbs. Powered by eight Pratt & Whitney J57 turbojet engines, each rated in the 10,000 lb. thrust class. Boeing-developed "Flying Boom" aerial refueling gives the B-52D virtually unlimited range beyond the specified "more than 6000 miles." Speed, 650 m.p.h. Service ceiling, over 50,000 ft.



POLYESTER REINFORCED FIBERGLASS PANEL SUPPORT

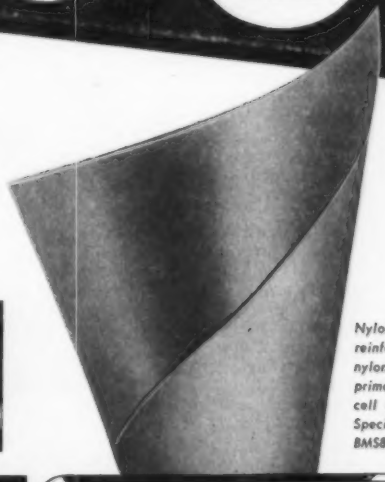


Typical Swedlow Parts on the Boeing B-52D

PANEL SUPPORT

and... more parts fabricated by Boeing from Swedlow laminated sheeting

Die-cut liners. Specification BMS8-9B polyester fiberglass reinforced laminate.



Nylon resin reinforced by nylon cloth. Used primarily as fuel cell support. Specification BMS8-13A

Manufacturers of low and intermediate pressure reinforced laminates, press or continuously formed . . molded parts by matched tooling and vacuum forming methods. Utilizing acrylic, polyester, phenolic, nylon, epoxy, silicone and related resins . . . fillers of paper, fiberglass, cotton, nylon, dacron, orlon, and combinations thereof. Honeycomb cores, parts with reinforced faces. Transparent plastic glazing materials, including stretched acrylic sheets and formed parts.

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LETTERS

Defense of airline pilots

To the Editor:

In the May 20th issue of AMERICAN AVIATION, Letters section, Mr. R. B. Witter of the Dye Oxygen Co. points up a problem of which all pilots are becoming very aware, namely, aircraft traffic control. But Mr. Witter's statement that "all of the airlines and most airline pilots are of the opinion that private aircraft should have secondary place in the sky and should concede to them at all times" is quite erroneous and a poor approach to obtaining the NEA pilot's side of the incident.

I assume that Mr. Witter is a corporation pilot, which to my way of thinking aligns him with the rest of us who not only make our living by flying airplanes for pay, but are interested in finishing up the month with 85 hours—alive. Believe me, I've no desire to hamper any aircraft in flight or on the ground nor to be so boorish as to feel that four engines hung on the wing give me an exemption from courtesy. Yet too many well-meaning people set their lances and tilt off at any and all airline pilots feeling that we have some fantastic disregard for them.

Constructively, as in Mr. Witter's case, might I suggest a personal contact between the pilots concerned in these incidents could bring to light some contributing factors such as the standard one—cockpit visibility.

In short, let's get together and work it out. As the man said, "A wing tip through your window may spoil your day." *G. W. FAY, Airline pilot, Seattle, Washington.*

Those airline route maps

To the Editor:

As a world air traveler for some 25 years, I am vastly proud of our United States airline systems. They are, indeed, the most efficient and finest in the world and their personnel are pleasant and charming.

However, there is one amusing and confusing factor which would involve only the people who are interested in the estimated time of arrival and trying to keep track of where they are during the flight. Having traveled throughout the U.S. many hundreds of times, I have collected route maps from all the airlines.

During my past history, I was involved as navigator and pilot for one of the world's largest airlines and it is natural, therefore, that I unconsciously do some sort of mental navigation on every flight I make. I never had any trouble with navigation until I began navigating on the maps presented by our airlines. These are the ones inserted in the seat pocket for advertising—certainly not for technical navigation.

The variance between airlines on direct routes is absolutely amazing.

Example 1. New York to Chicago: Airline A, 713 miles; Airline B, 711 miles; Airline C, 738 miles; Airline D, 731 miles.

Example 2. Washington to N. Y.: Airline A, 205 miles; Airline B, 215 miles; Airline C, 229 miles.

Example 3. Dallas to Memphis: Airline A, 483 miles; Airline B, 420 miles.

Example 4. Dallas to Nashville: Airline A, 620 miles; Airline B, 701 miles.

Example 5. Chicago to Portland: Airline A, 1,758 miles; Airline B, 1,777 miles.

Example 6. Chicago to Seattle: Airline A, 1,740 miles; Airline B, 1,749 miles.

The cross-country Great Circle route, for example, Los Angeles to New York 2,467 miles (correct USAF maps) varied from 25 to 100 miles.

The most inconceivable is the relationship of scale mileage to actual mileage because the scales seem to vary throughout the map projection and accurate navigation with the scale is absolutely impossible. In one case, with Airline A there is even variance between given distances and their own map projection. So, in short, it is quite impossible to do any sort of navigation with the information our airlines give the passengers.

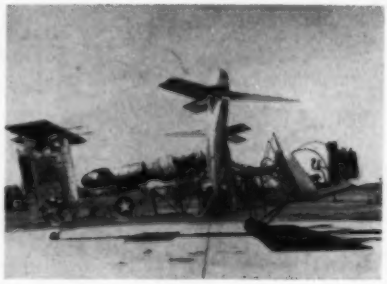
Perhaps the writer is a bit sensitive on the subject because, having prided himself on accurate navigation, he has lost several bets aboard aircraft because of the situation outlined above. At least I like to feel I can blame it on that cause.

While I would not travel any other way and I am sure any confirmed airline traveler feels the same, I feel there is an element of boredom in all means of transportation, especially air travel, and this is one way a passenger can entertain himself; so let's have correct route maps. Then the passenger can feel 100% responsible for his own poor navigation. *J. W. WALKER, JR., New York, N. Y.*

Liked Vertol story

To the Editor:

All of us here are extremely pleased with the terrific job you did on the Vertol



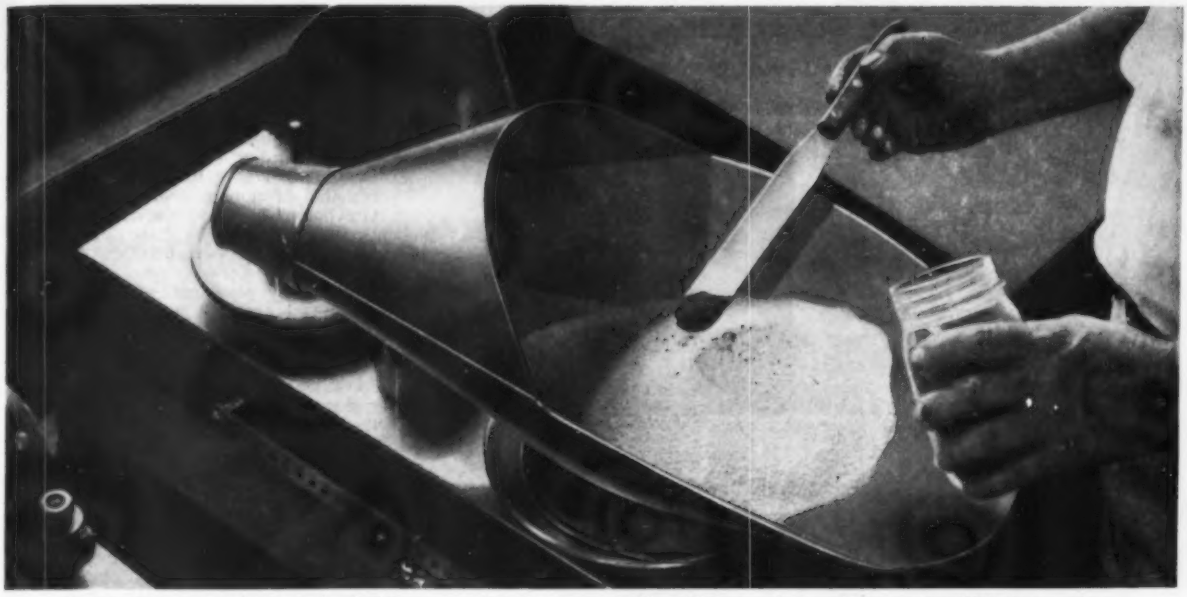
76 (AMERICAN AVIATION, May 6, p. 41) . . . our engineers felt the article was extremely well done and accurate. J. C. WAUGH, *Public Relations Manager, Vertol Aircraft Corp.*

Dissenting opinion

To the Editor:

Well, your little Personal View editorial on the unfunny incident reported in your March 25, 1957, issue finally did it as far as I am concerned. It certainly is difficult for one to gracefully admit he is wrong, isn't it?

After having been reminded of several possible violations of the CAR by the transport pilot, the lightplane fraternity now has been taken to task, on the basis of courtesy and judgment, since



(1) Imagine a room kept spotlessly clean . . . where temperature and humidity never vary . . . where the air is filtered, and workers are provided with special lint-free clothing. These are the conditions under which the manufacture of Aeroquip 666 Hose starts, with a mixture of exact amounts of sifted Teflon powder, lubricant and coloring.

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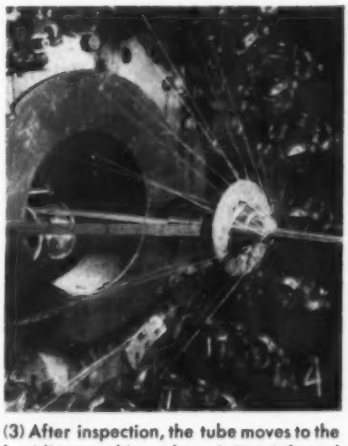
. . . the Only Secrets Are the Methods Used to Guard the Uniformly High Quality of Aeroquip 666 Hose (Teflon)

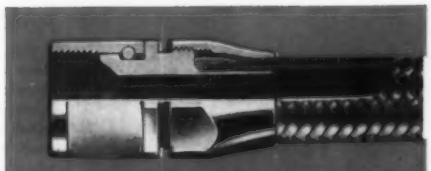
(2) After proper aging, the mixture is formed into a "cake" which is fed into an extrusion press and emerges as tubing. Wall thickness, diameter and concentricity are carefully controlled. The tube of Teflon passes through electric ovens (pictured above) where it is sintered and assumes the characteristic "Aeroquip red" color.

*DuPont Tradename for its Tetrafluoroethylene Resin



(3) After inspection, the tube moves to the braiding machine where it is reinforced with stainless steel wire. The closely controlled method used results in exceptionally tight, positive braiding . . . a distinctive Aeroquip feature. After passing final tests, the hose is identified as "Aeroquip 666", your assurance of unequalled quality in hose lines made of Teflon.

super gem is an Aeroquip Trademark



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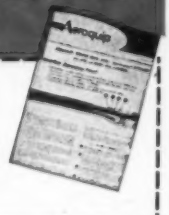

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LETTERS

no rules can be found to support your position.

As a lightplane pilot of relatively few hours, but well over twenty years' experience. I have been unhappily watching the developing conflict between the Greyhound buses of the air, who number less than 2,000 and the some 60,000-odd privately operated aircraft, who the CAA tell us stack up considerably more hours and passenger miles than the scheduled carriers.

The assumption that the scheduled carriers can do no wrong, by those of you who really fail to see the grass roots of aviation, other than from a rather distorted view one might get from the ATA, or the front end of a commercial carrier, is somewhat similar to taking the position that motor cars should give way and mind their courtesy to buses and trucks. There was an era of unhappy relationship in this field also, until the operators of these buses and trucks realized that their drivers through sheer mass and presumption were out scaring and insulting their potential customers. Happily enough the situation changed for the better, and generally now, the trucks and buses through driver education do their best to treat the private motorist as just that—a potential customer.

I do not mean to infer that there are not a great many private pilots, as there are a great many private motorists, who jeopardize themselves and others just because the situation affords them the right of way. If you will check the record, however, you will find that by far and away the majority of incidents resulting in actual damage between private aircraft and commercial carriers, at least in the last few years, have been found by the CAB to be largely the fault of the commercial carriers. . . .

Heaven only knows I am pleased to get out of dense areas as rapidly as possible and stay away from the airways, even though I have as much legal right there as the commercials, but I simply cannot afford to be present when these "big boys" are either locking horns, as in the case of the Grand Canyon Accident, or practically threatening to do so, as one might deduce from that recent little exchange between TWA and the New York ARTC controller.

It looks as though the old axiom still applies about throwing the first stone and at this stage in their public relations, it does not appear that the transport industry is in a good position to start throwing. This whole issue, it did appear, could stand a little less heat and a little more light. *D. H. MORETON, 560 Marquette Street, Pacific Palisades, Calif.*

Speaking about workhorses

Letter to the Editor:

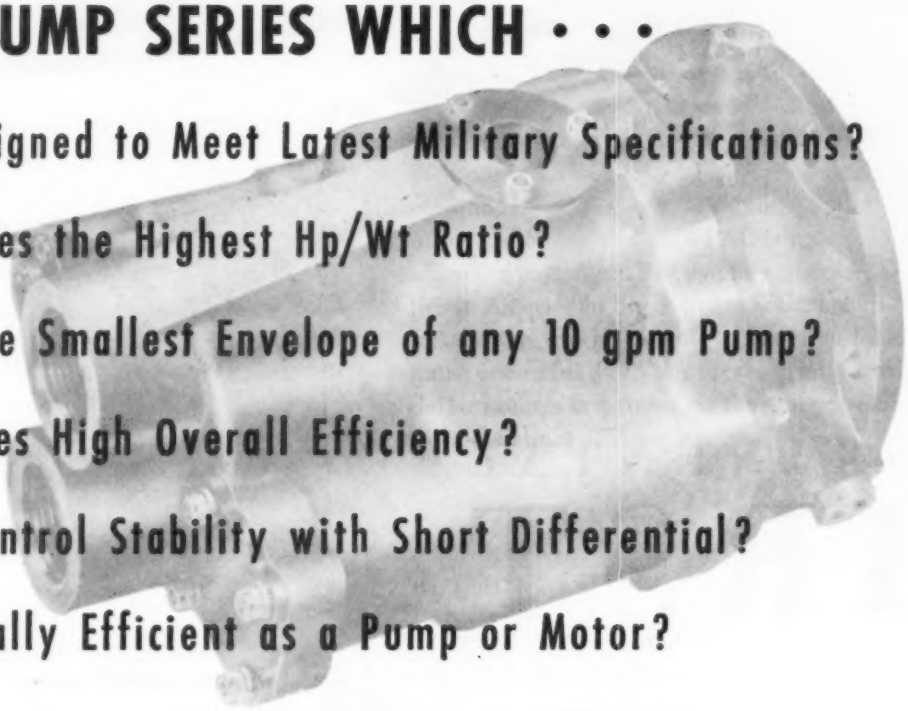
In your Annual Air Transport Progress issue of AMERICAN AVIATION (22nd April 1957) it is stated in the Spotlight Column (p. 26) that the biggest DC-3 operator in the U.S. and probably in the world is North Central Airlines. This year they have overtaken Capital by logging 55,651 hours and 7.9 million passenger miles, it is reported.

For your information, BEA, with its fleet of 46 DC-3s (38 DC-3 Pionair

Continued on Page 22

is there

A NEW, LARGE CAPACITY 3000 PSI PUMP SERIES WHICH . . .



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Pacific Airmotive Corporation's headquarters are located at 2940 North Hollywood Way, Burbank, California, with branch facilities at Denver, Colo.; Kansas City, Kan.; Linden, N. J.; Seattle, Wash.; Oakland and Chino, California. PAC is supplier and distributor for these leading manufacturers of aircraft equipment, parts, and acces

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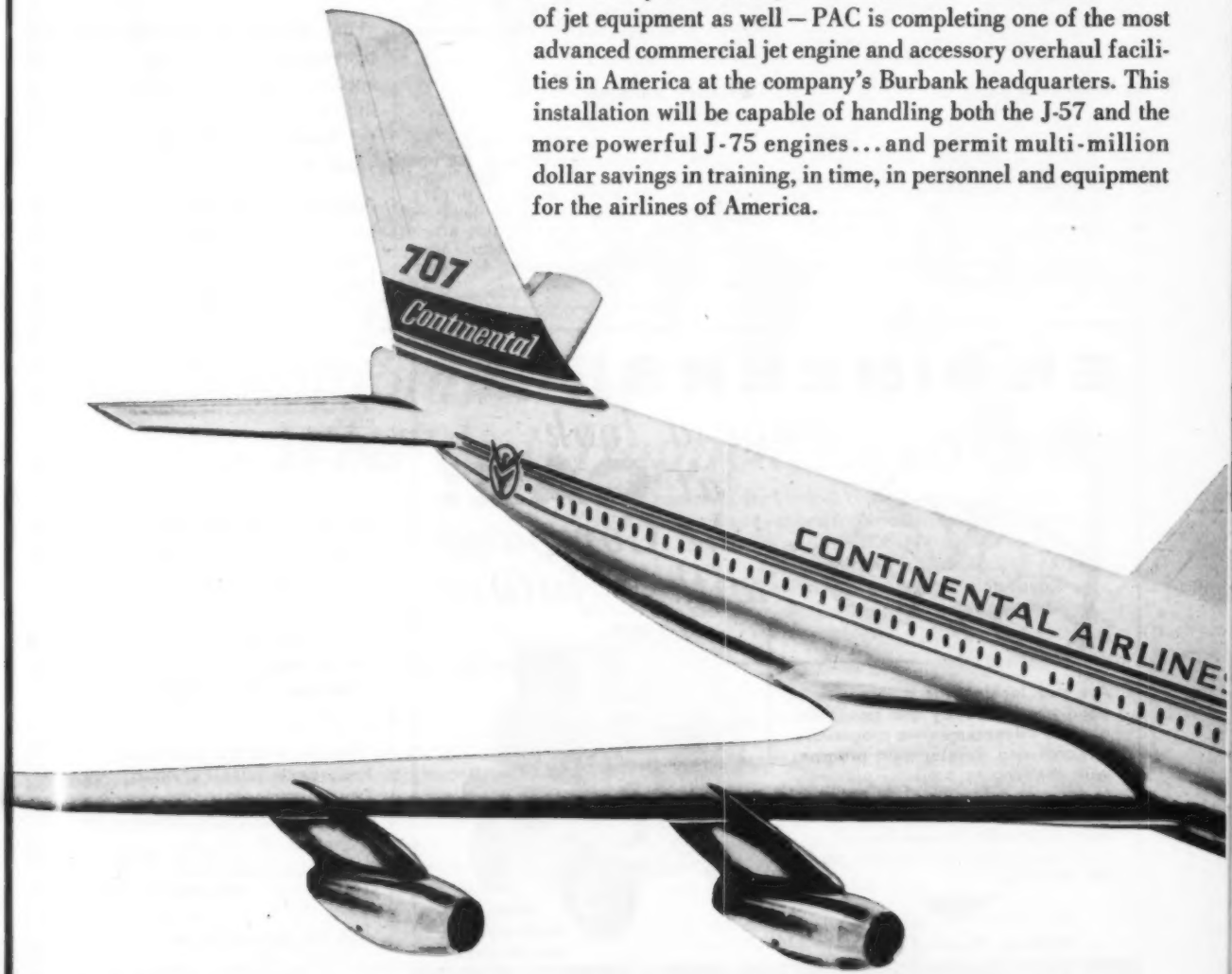
in America to enter into long-term contracts for the maintenance and overhaul of commercial J-57 Jet Engines and their accessories! And PAC is justly proud that Continental Air Lines will rely on its services to maintain the jet engines powering their new fleet of Boeing 707's. PAC leads the industry in experience on the Pratt & Whitney engine—many hundreds of these jets and their accessories have been reworked and modified by PAC. Now, for Continental—and for other users of jet equipment as well—PAC is completing one of the most advanced commercial jet engine and accessory overhaul facilities in America at the company's Burbank headquarters. This installation will be capable of handling both the J-57 and the more powerful J-75 engines...and permit multi-million dollar savings in training, in time, in personnel and equipment for the airlines of America.



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Continued from Page 18

passenger-carrying aircraft and 8 Pionair-Leopard Convertible passenger-freighters) has logged well above that figure of 55,651 hours during the past five years. Following is a table showing the hours flown with these trusted workhorses of ours:

DC-3
(Dakota, Dakota Freighter, Pionair & Leopard Versions)

Year		*Hours Flown*
1946	(August-December)	9,299
1947	(Calendar Year)	26,493
1948	" "	32,814
1949	" "	38,943
1950	" "	50,845
1951	" "	54,906
1952	" "	71,945
1953	" "	77,922
1954	" "	67,182
1955	" "	71,512
1956	" "	75,813
	Total	577,674

Signed:
Grenville Manton
Press Officer
British European Airways
London, England

He REALLY likes us

To the Editor:

Have had the pleasure of reading your highly informative magazine for quite a few years. Your articles are up to the minute and very instructive. The new sections (Airtrends, Digest and Washington Trends) are a big improvement . . . .

You deserve a bouquet for your very informative En Route. Can actually picture your experiences in the USSR and Africa. I can appreciate your frustrations, and elations at finding unexpected good food and lodgings. For more years than I like to think about prior to World War II, I spent many years in Central and South Pacific, and three years in China after the war. So I know exactly how you felt.

May we have more of these articles and make you an ambassador of information for the entire aviation industry. *GORDON H. STEPHENS, Redondo Beach, Calif.*

Sikorsky prediction

To the Editor:

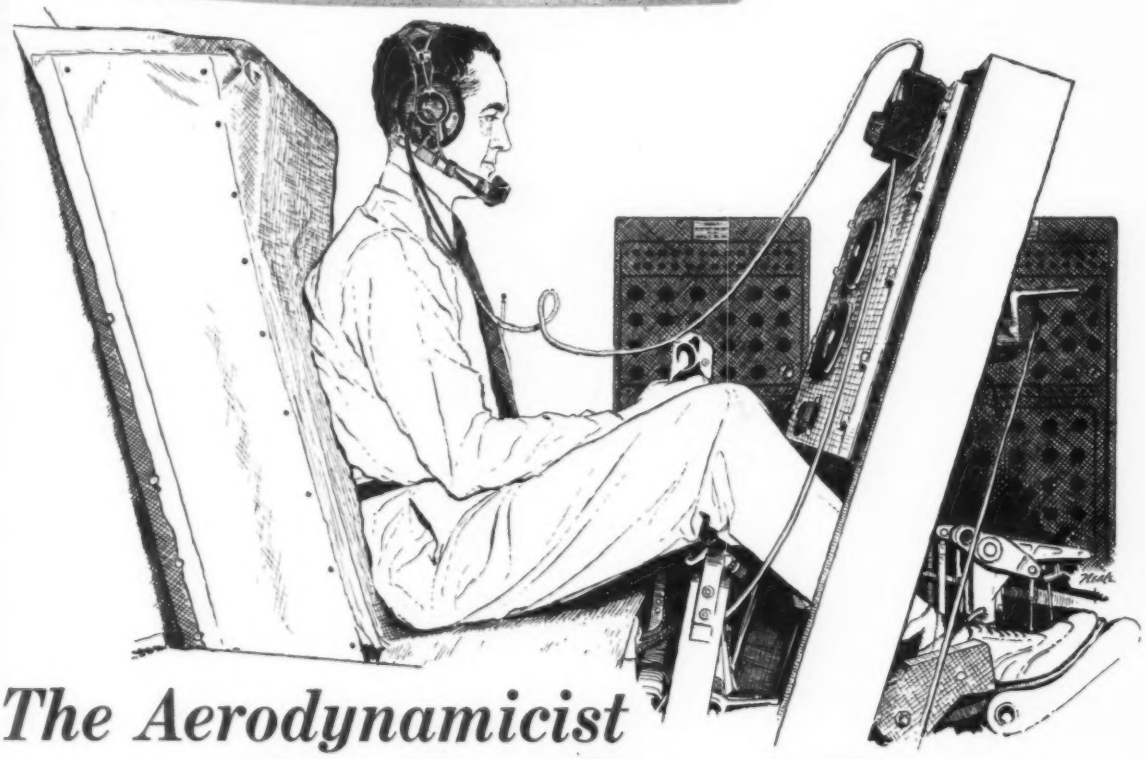
We would very much appreciate receiving permission to reprint the article, "Sikorsky officials predict 'golden age' for 'copters to dawn in 1960," found on pages 37 and 39 in AMERICAN AVIATION May 20. . . Indiana Gear Works manufactures transmissions for Sikorsky helicopters, so, we feel that the information contained in the article will be of considerable interest to our people. *JANE H. QUIRK, Editor, The Indiana Gear Box, Indianapolis.*

Curiosity aroused

To the Editor:

I just read in the paper of the announcement in your magazine of the new ceramic that is stronger than steel (AMERICAN AVIATION, June 3, p. 27). Would you be good enough to send me a copy of the issue in which this article appeared. *M. EPSTEIN, General Manager, Industrial Engineering & Equipment Co., St. Louis, Mo.*

A Vought Vignette
NO. 4 IN A NEW SERIES



The Aerodynamicist Who Test-Hopped Equations

There'd never been a fighter that could barrel at more than 1,000 mph one minute and land on a carrier the next. And, as a result, there was unusually keen advance interest in the flying qualities of the airplane proposed by Chance Vought.

Jim Madden was more than curious. As an aerodynamic design specialist, he would help develop the Crusader's handling qualities. His job began with wind tunnel tests.

Jim converted tunnel information into a graphic picture of static and dynamic forces affecting Crusader stability. He used analog computers and equations of motion to predict the build-up of forces during maneuvers. Hinge moments, loads, and required rates of control motion were determined and released to Servomechanism and Product Design groups. Soon the Crusader's stabilization and power control packages began to take shape.

Jim's part in the project could have ended right there. But Vought's control system simulator helped him proceed to some thoroughgoing conclusions.

It duplicated the complete rod system and all servomechanisms that would control the speedy new fighter. In the simulator's cockpit, high above the Structures Lab floor, Jim previewed control responses that test pilots later would experience. Airplane responses to Jim's rudder kicks and aileron movements were recorded on analog computers. Any inability of the control system to position the aircraft during flight was easier to spot . . . and, with test and design engineers on hand . . . easier to correct.

"It was like a big schematic — only better," says Jim of the simulator.

"It gave me a chance to work with the whole system.

"And actually watching aircraft responses to the controls gave me a feeling for how fast they happen."

Another thing that moved fast was Crusader development. Vought's simulator and other facilities detected problems before they compounded. The fighter reached operational readiness in record time.

Research, design and test facilities at Chance Vought allow the engineer to do a thorough job in advanced problem areas . . . assure high reliability in Vought-developed weapon systems.

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It was specifically designed for long periods of ocean patrol duty . . . tactical coordination with naval surface craft on defensive and offensive manoeuvres . . . convoy and search-rescue operations.

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CA57-057 1

AIRTRENDS

Look for Air Force to center its economy drive on new target—reduction of contractors' overhead charges. AF Secretary James Douglas has issued instructions that such charges come under closer scrutiny, company by company.

Result: Tighter criteria for determining "excessive" charges will be imposed. And campaign will affect both present and future contracts.

First firms under scrutiny are those now suspected of having comparatively higher indirect costs. USAF is certain the cost-per-pound of airframe for some specific aircraft types could be cut by tightening overhead allowances.

First effects of Air Force drive will be felt during renegotiation of existing contracts. All new awards will be negotiated by AF with view toward across-the-board reduction. Areas to be challenged: excessive engineering staffs; indirect labor charges; unusual executive benefits and company-supplied machine tools.

Army has emerged with a first-round victory in its fight to keep its Jupiter IRBM alive. Air Force prejudgment of outcome of Jupiter-Thor competition has spurred Defense Department to quietly retract AF funding responsibility in fiscal '58—authority it was to have under the controversial Wilson "roles and missions" memorandum.

Instead, Defense inauspiciously has promised Army funds for Jupiter from its own R&D emergency budget sometime this August—in essence a veto of USAF's elimination of project in its fiscal 1958 budget.

Although Defense switch does not affect USAF role as sole employer of land-based IRBM, it emphasizes DOD intent to carefully supervise funding of Jupiter and Thor until it decides which will become operational.

Sharp rise in military spending for electronics, reaching $3.5 billion by close of present fiscal year, is borne out in budget computation by Radio Electronics Television Manufacturers Assn. RETMA compares $3.5 billion figure with $2.8 billion in fiscal '56; first three quarters this year topped $2.492 billion against only $1.983 last year.

Military aircraft and missile budgets accounted for more than 65% of total all Defense electronic spending, totaling $1.516 billion. Communications was next with $617 million. Some $221 million was expended during first three quarters on specific electronics R&D projects.

Army aviation is managing to live and expand under Defense mission directive to a much greater degree than its missile activities. In the only two instances it has "sued" for exception to 5,000 lb. weight limit—Grumman high performance observation project and plan to use De Havilland Canada DHC-4 Caribou—Army has won Defense blessing. And latter appears to be as far as Army now plans to go in fixed-wing gross weights.

There's more than meets the eye to Boeing announcement that Bomarc missile is a family of weapons, not just a specific model. It virtually confirms that several new versions of the ramjet-powered IM-99 are forthcoming.

Among types to be expected is a missile-carrying missile. Bomarc may be given a multiple punch by carrying Hughes Falcons or other air-to-air weapons.

DIGEST

Russians develop in-flight refueling system that enables 4-jet Bison bomber to make roundtrip to North America

by Anthony Vandyk

MOSCOW—Conclusive evidence has been presented here that Russia has succeeded in developing a flight-refueling system capable of enabling its big four-jet bomber, the Bison, to reach the North American continent and return to the Soviet Union.

Observers watching rehearsals early in June for the Red Air Force air show to be held at Tushino Airport, Moscow, on June 30 distinctly saw a Bison bomber connect with a Bison tanker using the "probe-and drogue" method developed by the west several years ago. Hitherto the only Russian refueling system was a primitive "Buddy" system used experimentally for the Badger medium bomber.

Development of modern refueling methods for the Soviet's heavy bomber, counterpart of the Boeing B-52, may well cause another revision of USAF intelligence estimates of Red strength. Earlier this year, Gen. Nathan Twining, USAF Chief of Staff, told Congress that the turboprop Bear bomber was now considered to be "more of a threat" than the Bison because of "far greater range."

In-flight refueling was found to be the answer in making the B-52 a truly intercontinental bomber. Russia's evident progress in this area may well give the Reds the same capability.

While U.S. has reduced its estimates of Soviet heavy bomber build-up for the next two years, the Russians, with the range problem licked, could well accelerate the Bison production program to replace the Bear turboprop.

The air over Moscow early this month was active with both bombers and very high speed fighters, all presumably rehearsing for the June 30 show. The Tushino show this year may last about an hour longer than last year's, which ran 80 minutes.

Transport version of the big Bison may appear in the show as well as a Tu-114 transport version of the Bear turboprop bomber (see drawing). The Tu-114 is currently being flight-tested, it is reported. It has a cruising speed of over 500 mph and can accommodate 180 passengers. A particular feature of the transport is its very long-range—over 10,000 miles.

Another new turboprop transport that is almost certain to appear at the Tushino show is the Antonov Ukraina (see page 82). This four-turboprop medium transport is slated to enter service shortly with Aeroflot. Another new turboprop transport that may appear at Tushino is the Electra-like Ilyushin Il-18. This aircraft was seen in flight over Moscow at the beginning of this month.

Defense Dept. declassifies Doppler radar data

Defense Department has paved the way for airline use of "self-contained" navigation systems in jet transports by wholesale declassification of data on Doppler radar navigation systems.

Recent Pentagon order, which lifts the security ban on about 10 different Doppler systems, opens the door for talks between scheduled airlines and manufacturers on technical aspects of self-contained navaids.

Pan American World Airways, TWA and Northwest have expressed most interest in the new navaids for —primarily for their international operations—but have been impeded in system selection by military security restrictions.

As an immediate result of the Defense relaxation, three USAF contractors—General Precision Laboratory, Raytheon and Laboratory for Electronics—are expected to proceed with commercial system development, as will Ryan Aeronautical Co., a Navy contractor.

GPL reportedly is at present the only firm in production with its first system installed in an operational military aircraft. Its commercial equipment, to be called Radan, is expected to be ready for delivery to airlines in about eight to 12 months. GPL system weighs about 85 lbs.

Laboratory for Electronics, Boston, is reported ready to enter production of its military Doppler system and Raytheon is expected to begin manufacturing in 18 months to two years.

Defense officials told AMERICAN AVIATION the basic Doppler equipment can be used for airline navigation, but that certain displays now related to military bombing systems might require change.

Big feature sought by airlines in the new systems is a direct cockpit indication of ground speed and drift angle, data not heretofore available.

TWA set to bid for military overhaul

Trans World Airlines is ready to make its first bid for military overhaul work to be done at its new overhaul base at Mid-Continent Airport at Kansas City, its president, Carter Burgess, says.

At a conference held with members of the Aviation Writers Association, Burgess also stated that a "sensible and reasonable" increase in domestic and international fares is required to meet airlines' demand for new equipment.

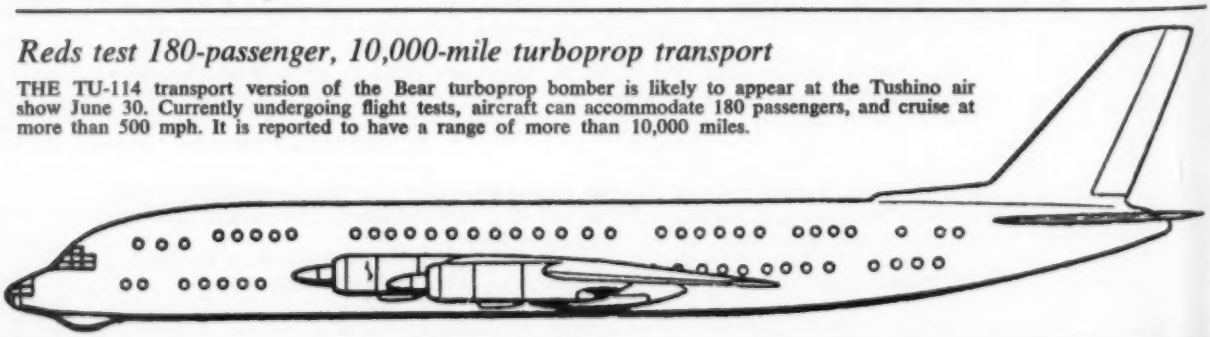
Jupiter reaches altitude of 250-300 miles

Army's Jupiter missile was successfully fired to the limit of its range recently. The instrumented missile reportedly reached an altitude of about 250 to 300 miles.

This was the third test firing of the Army IRBM. Two earlier tests ended when the missiles exploded prior to burnout. Sloshing fuel was blamed for the mishaps and fuel tank baffles were used in the third test.

Reds test 180-passenger, 10,000-mile turboprop transport

THE TU-114 transport version of the Bear turboprop bomber is likely to appear at the Tushino air show June 30. Currently undergoing flight tests, aircraft can accommodate 180 passengers, and cruise at more than 500 mph. It is reported to have a range of more than 10,000 miles.



U.S. airbases in Spain, built at cost of $300 million, near completion; SAC to start operations this fall

by Henry T. Simmons

MADRID—The $300-million U.S. airbase program in Spain is rapidly nearing completion, with limited operations by the Strategic Air Command to commence this fall and full operational status to be reached by next summer.

This was disclosed by Maj. Gen. A. W. Kissner, commander of the Joint U.S. Military Group in Spain, who also announced that SAC will take over the Spanish airbase complex on July 1 by assuming control of the Sixteenth Air Force commanded by Maj. Gen. Henry K. Mooney.

The USAF is constructing three SAC bomber bases and a support base in Spain, while the Navy is building an elaborate dock and naval air station facility at Rota, near Cadiz on the southern Atlantic coast of Spain. The USAF's bases include Saragossa, 200 miles northeast of Madrid; Torrejon at Madrid, and Moron, near Seville, in southern Spain. It is also expanding the commercial airdrome at San Pablo for support operations.

Torrejon, near Madrid, is 16th AF headquarters.

Linking the nearly completed string of Spanish bases is a 481-mile pipeline for moving petroleum, oil and lubricants from Rota all the way to Saragossa. The $45-million project has been completed and tested, and is expected to go into full operation shortly. It is now pumping fuel to Torrejon.

Total amount so far appropriated for the combined Air Force-Navy program in Spain is $290 million. The services have asked another $60 million for projects in fiscal 1958. About $160 million in facilities are now in place and work is proceeding on schedule.

Unlike the complex of bases built in French Morocco on a "crash" basis during the Korean War, the Spanish construction projects are orderly, with maximum use of Spanish subcontractors.

Key base in the Spanish complex is Torrejon, which will be Gen. Mooney's headquarters. It will be able to handle administrative aircraft in July. First exercises with SAC bombers should begin in October. Total cost of the facility under the present program will be $62 million.

Torrejon is the only one of the three major facilities which SAC plans to augment on a full peace-time scale. Saragossa, valued at $37 million, and Moron, valued at $34 million, will be maintained in a state of readiness by permanent detachments, but it is not expected they will be used for SAC wing rotations for the immediate future.

Hand-in-hand with the construction of the Spanish base complex, the U.S. has built up the Spanish Air Force. A total of 160 F-86F Sabrejets have been delivered to date—enough for five squadrons—and it is planned to provide the Spanish with a total of nine fighter squadrons. These will be augmented by squadrons of U.S. fighters stationed at each of the three major installations, plus an $18-million aircraft control and warning and communications system. Four AC&W radar stations are now under contract.

The U.S. base rights agreement with Spain was signed in September, 1953. It provides that the U.S. may occupy the bases for a period of 10 years and establishes two periods of five years each for automatic renewal.

In case of objection, a period of six months is allowed for negotiation, plus another year to move out if the renewal cannot be negotiated. If the U.S. should depart at any time prior to the end of the 20-year period, the Spanish will pay for the "residual value" of installations not removed by the U.S.

AF orders X-7 follow-on

Lockheed Aircraft Corp. has received a $14.5-million Air Force contract for continuation of its X-7 ramjet engine test vehicle project. Contract extends the program into mid-1958.

Atlas blows up during test firing

Air Force fired its ICBM Atlas last week but the big weapon blew up at about 5,000 ft. Pieces of the missile were reported to have fallen in the ocean only a few miles offshore of Cape Canaveral, Fla.

This marks the sixth time in recent months that U.S. ballistic missiles have been tested unsuccessfully. Two Army Jupiter missiles burned out in a few seconds before the third and successful launching was made early this month. Three AF Thor missiles were destroyed —one intentionally after it strayed from its course, one rose only a few feet from the launching pad and the other blew up during fueling.

Douglas DC-7D plans hinge on negotiations

Douglas Aircraft Co. will go ahead with the DC-7D turboprop version of the DC-7C, using Rolls-Royce Tyne I engines, if sales negotiations now under way are fruitful.

Major prospects at this time are American Airlines and Flying Tiger Line. Potential sales to FTL are reported to include as many as 20 aircraft.

Fuselage, wing, tail and landing gear of the DC-7 would have to be beefed up to accommodate the Tyne engines. Douglas estimates payload of the turboprop at 70,000 lbs.

Beech reveals details of combat drone

Beech Aircraft Corp. has revealed details of its proposed Model 1013 combat reconnaissance drone, which is adapted from its Model 1001 target plane. Designed for either air, ship or ground launch, the 1013 is powered by a 110-hp McCulloch engine. Grossing 800 lbs., it will have an operational speed of 260 mph and a service ceiling of 22,800 ft.

Beech officials also revealed that the Model 1001 (Navy XKDB-1) made its first free flight recently at the Naval Air Missile Test Center. Target plane has 120-hp. turbo-supercharged McCulloch engine, flies at 320 mph above 40,000 ft., grosses 600 lbs.

Rhodes heads AWA

George Rhodes of the San Francisco *Call-Bulletin*, is new President of Aviation Writers Assn. He succeeds David Wallin, St. Louis *Post-Dispatch*. Other new officers: First Vice President, Edwin Pipp, *Detroit News;* Second Vice President, Cecile Hamilton, *Flying* Magazine; Third Vice President, Stanley Cisowski, Flint, Mich. Ralph McClarren was reelected Executive Secretary and Leslie Spencer, Treasurer.

Washington, D.C., June 17, 1957.

WASHINGTON TRENDS

No unity on unified procurement

Senate purse-string holders, startled at soaring defense costs and overlapping items on the military shopping list, are pushing a controversial plan to unify Pentagon procurement activities.

Sens. Dennis Chavez (D-N.M.), Allen Ellender (D-La.) and Stuart Symington (D-Mo.) called for more uniform buying procedures during a heated session of the Military Appropriations Subcommittee.

But the proposal failed to move Defense comptroller W. J. McNeil. He thinks the present arrangement is best, that uniformity for uniformity's sake won't save money. He also is cool to suggestions of a centralized purchasing agency to end duplication.

Defense Secretary Wilson is opposed to unified buying, favoring "healthy competition." His deputy, Donald Quarles, however, is known to be an advocate of greater unification.

Meanwhile, Sen. Joseph O'Mahoney (D-Wyo.) said he planned to tack an amendment to military appropriations bill that would provide for a civilian-managed centralized procurement agency. However, it would exempt combat items.

Bilateral repercussions coming

There will be repercussions if, as it appeared last midweek, Australia comes out of its bilateral talks with U.S. with a Sydney-London route via San Francisco.

The award is bound to spark new protests in Congress. Sens. Allen J. Ellender (D-La.), Karl E. Mundt (R-S.D.) and Homer Capehart (R-Ind.) are on record with vigorous objections. And Senate Commerce Committee chairman Warren Magnuson (D-Wash.), vocal critic of State Dept.'s air policy, also is against the Australian bid.

Indications were that Qantas' present Sydney-San Francisco route would be extended to Great Britain.

Hector: non-conformist in CAB

CAB's new Democratic Member, Louis J. Hector, is shaping up as a non-conformist in the Washington bureaucratic whirl. One of Hector's first moves when he assumed the Board post was to move out the solemn-looking government furniture, substitute modern office equipment he transported from Florida.

Hector also departed from usual staff lineup wherein a Board Member hires an administrative assistant and two secretaries. Instead, he is staffing with two male assistants and one female stenographer. One assistant will serve as confidential secretary; the other, yet to be hired, will serve as an economic adviser.

Early reading on Hector is that he is far from timid in private Board meetings and is a stickler for legislative reasoning.

Air Force's newest dimension

USAF, primarily concerned with supersonics, hypersonics and such, has gone to the other extreme at its Denver Academy. It has accepted delivery on the first of several sailplanes from Schweizer Aircraft Corp.

Soaring is not new at the academy, but these are the first official aircraft to go into service. Thus the U.S. finally has adopted a flying system that is old hat to Europe, where soaring has been a primary source of airmen for many years.

Aviation researchers to aid AAR

This announcement raised some eyebrows in Washington last week: Assn. of American Railroads has given Aeronuatical Research Foundation of Cambridge, Mass., a $25,000 research grant to study "avoidable costs" of passenger train service.

ARF conducted economic aspects of presidential aide Edward Curtis' long-range aviation facilities studies. It accepted the AAR grant on "explicit condition" that the study be "wholly independent and objective."

Foundation is nonprofit research organization founded in 1947 to aid group research of Harvard and Massachusetts Institute of Technology faculty members, but is not connected with either institution.

High-priority air show

Airline officials still are recovering from the shock of the last-minute warning given them by Navy to discontinue overwater "cut-off" route operations recently because of Naval display for President off Florida coast.

Carriers weren't notified until 8:30 a. m. that same day that Wilmington, N.C. to West Palm Beach corridor was being closed—and then only in a casual manner: a routine Notam. The result—no fewer than 29 New York-Miami airline flights rerouted inland and delayed 20 to 30 minutes.

No monopoly on words

Celler Antitrust Subcommittee is still working over details of its extensive report on monopoly in the airline industry. Predictions on a release date range from one to three months. Wordwise, it probably will edge the recent comprehensive treatment of the television industry.

Scalping the scalpers

Congress has moved to knock the profit out of "scalping" airline tickets. Irked over hustlers who buy up blocks of reserved seats under phony names and peddle them for fees as high as $50, CAB asked for stringent laws. If proposed legislation is passed, "scalpers" will face fines up to $5,000.

BERNARD SIMONS, Senior Project Engineer on the Convair 880 Jetliner. A graduate of the University of Detroit, Mr. Simons joined Convair-San Diego nine years ago as an engineering designer. He is respected for his contributions to jet airliner advancement — as well as his ability to develop engineering talent.

"Engineers...here's how we combined aileron and spoiler functions in our new Convair 880 Jetliner."

"Consistent with our 34-year record of significant contribution to aircraft development, a selected group of engineers at CONVAIR-*SAN DIEGO* accepted the challenge to develop a *new* control surface concept for the Convair 880 – world's fastest jet airliner.

"Working as a team, we created a *mechanical* mixer, which combined, for the first time on any commercial aircraft, the control of ailerons and spoilers. These surfaces function as both speed brakes *and* lateral controls, and because the mixer affords direct connection to the surfaces, it gives pilots *positive* feel of the controls. Its mechanical design of bellcranks and levers permits fewer adjustments and easier, less costly maintenance to airlines operating the Convair 880.

"Important as this project is, it represents only *one* of the many creative assignments being solved at CONVAIR-*SAN DIEGO* – projects like our 880 Jetliner and F-102A Interceptor.

"You will enjoy this *diversity* of activity. You'll like the Convair atmosphere, where you see and feel accomplishment. And you will enjoy living in beautiful, smog-free San Diego.

"For greater career opportunity, for stimulating diversity – *for your future's sake* – send for more information about CONVAIR-*SAN DIEGO today!* Write Mr. H. T. Brooks, Engineering Personnel, Dept. 66-F."

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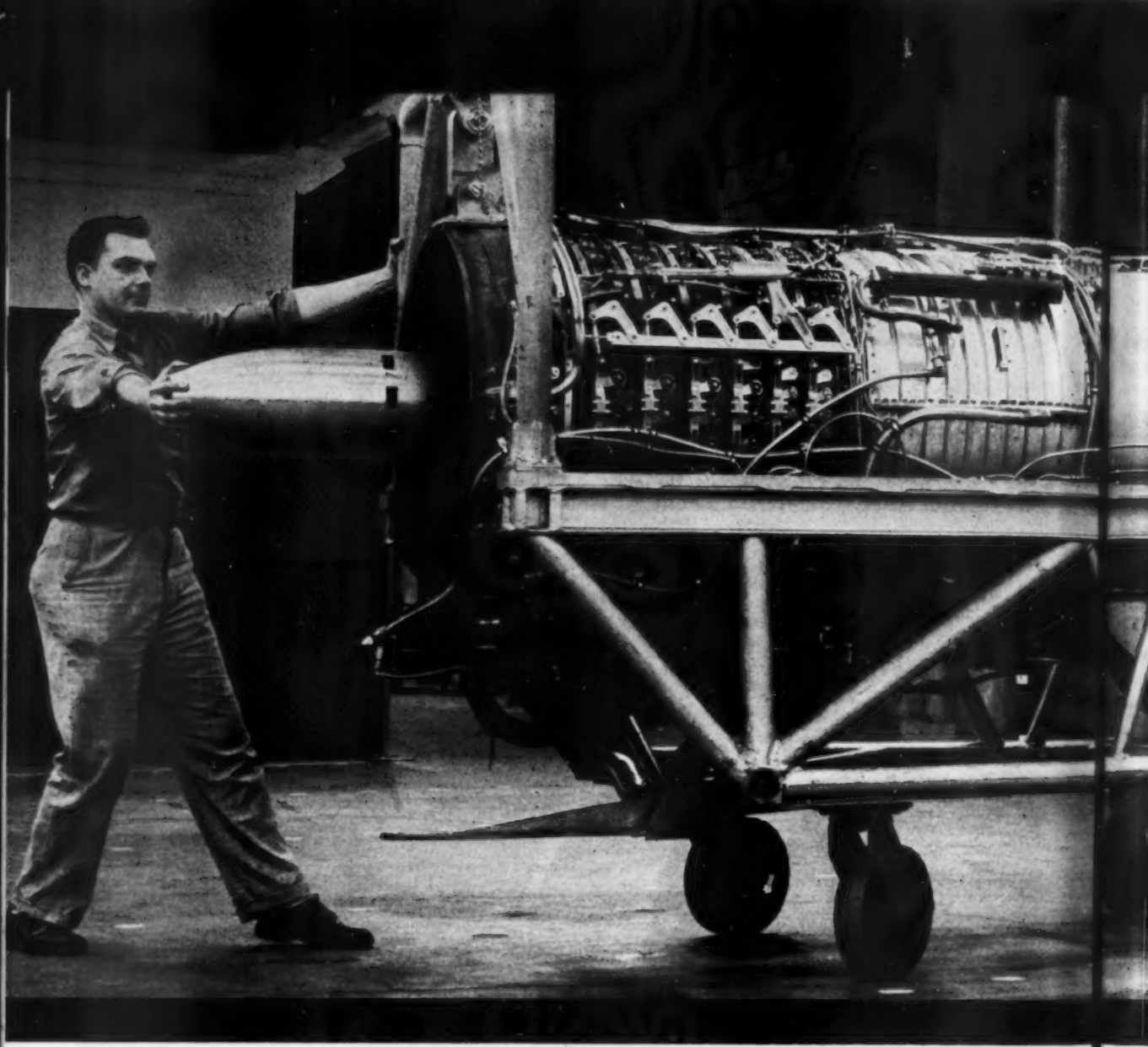
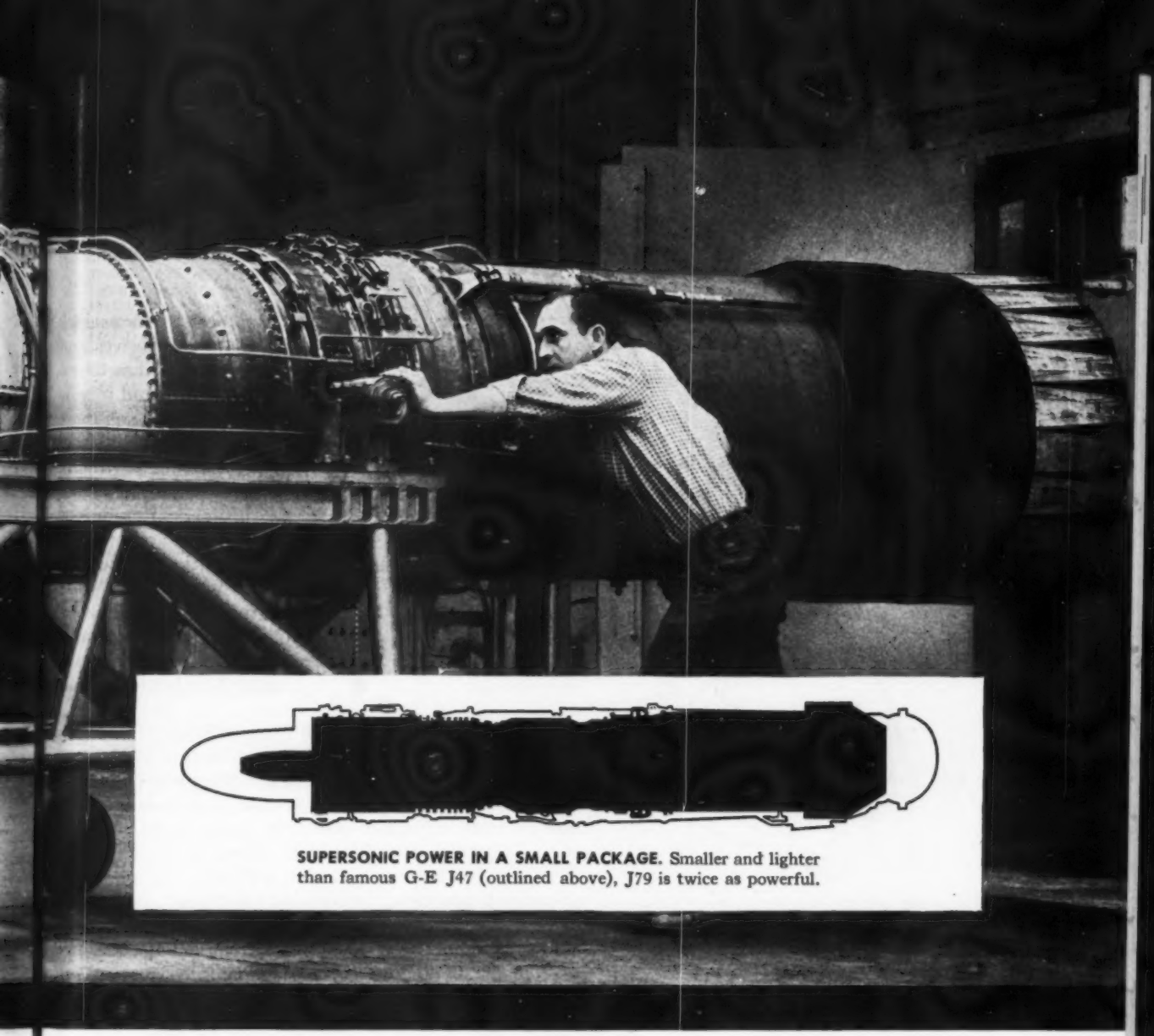


Why General Electric J79 provides . . .

SUPERSONIC POWER AND LIGHT WEIGHT



SUPERSONIC POWER IN A SMALL PACKAGE. Smaller and lighter than famous G-E J47 (outlined above), J79 is twice as powerful.

Washington, D.C., May 21—The General Electric J79—first U.S. jet engine capable of powering aircraft twice the speed of sound—was displayed publicly for the first time today. Rated in the 10,000 lb-thrust-class, the lightweight J79 has the lowest specific weight of any U.S. production turbojet.

Answering military demands for a mechanically-simple, high thrust-to-weight jet engine, J79 features include:

• **Variable stator**—To eliminate stall problems at "off-design" speeds and permit maximum compressor efficiency under all flight conditions, the first six stages of the 17-stage J79 compressor are variable.

• **Small frame size**—J79's diameter is less than three feet, its length about 17 feet.

• **Small hub diameter**—enables J79 to combine reduced-drag advantages of narrow frontal area with high airflow capacity.

Today powering USAF's Lockheed F-104A, Convair B-58, and the Grumman F11F-1F, the J79 continues to set the pace for America's jet powerplants.

General Electric Company, Cincinnati 15, Ohio. 235-17

Progress Is Our Most Important Product

GENERAL ELECTRIC

"FOLLOW THROUGH"

During more than ten years of pioneering the use of structural adhesives and laminating materials, Narmco has found that the airframe and missile manufacturer requires much more than the simple delivery of materials to his receiving department. He expects more... and rightly so! In today's complex business of producing supersonic aircraft and missiles, close supplier-user cooperation is essential. That's why Narmco has developed, and continues to emphasize as a policy, the use of "control" records for every customer... no matter how large or small.

Although Narmco inspects and tests products 100%... with over 27 separate checkpoints established in the production lines for performing precise, in-process and final control tests... Narmco goes even farther in its efforts to provide the ultimate in "down to earth" quality assurance to its customers. Generous physical samples of all Narmco production... structural adhesives... laminating materials... coating solutions and coated materials... and putties and resins are randomly selected during production and retained a minimum of 90 days after every shipment.

This makes it possible to provide the customer sample characteristics data on the specific material he received. This procedure affords the manufacturer an important "follow through" service in analyzing his own handling, storage, and use of the product and has frequently resulted in direct savings in manhours and materials when solving "stubborn" production control problems.

This unusual customer service "plus" is another important element in Narmco's assistance to the manufacturer... another reason why more and more Narmco products are being used in the airframe and missile industry... *doing jobs every day that metals alone can't do!*

NARMCO

PIONEERING THROUGH RESEARCH

Narmco technical field representatives throughout the United States and Canada can assist in solving your structural design problems quickly, efficiently and economically. For immediate assistance, write, wire or phone...

NARMCO RESINS & COATINGS CO. Dept. 21 600 Victoria Street, Costa Mesa, California

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WHEN-WHERE

JUNE

American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 16-21.

National Convention, Military Electronics, sponsored by IRE Prefessional Group, Sheraton Park Hotel, Washington, D.C., June 17-19.

IAS national summer meeting, Biltmore Hotel, Los Angeles, June 17-20.

Aviation Distributors and Manufacturers Assn., 29th meeting, The Broadmoor, Colorado Springs, June 23-25.

Transport Management Program, Stanford University, Stanford, Calif., June 23-July 20.

Soviet National Aviation Day, Moscow, June 24.

AIEE summer meeting, Sheraton Mt. Royal Hotel, Montreal, June 24-28.

Federation Aeronautique Internationale, Palermo, Sicily, June 25-30.

Aeronautical Radio, Inc., AEEC meeting, Miami Beach, June 26-28.

Institute of Navigation, annual meeting, Sheraton Park Hotel, Washington, D.C., June 27-29.

JULY

National Soaring Contest, Elmira, N.Y., July 2-11.

All-Woman Transcontinental Air Race, San Mateo County Airport, Calif., to N. Phila. Airport, Pa., July 6-10.

British Lockheed International Aerobatic competition, Kings Cup and National Air Races, Coventry Aerodrome, Bagington, England, July 12-13.

All-Woman International Air Race, McAllen, Tex. to Cuba, July 17-20.

National Flying Club Convention, sponsored by National Flying Club Assn., Inc., Denver, July 30-Aug. 2.

Air Force Assn., convention, Washington, D.C., July 30-Aug. 4.

AUGUST

IAS Naval Aviation Meeting, U.S. Grant Hotel, San Diego, Aug. 6-10.

International Ignition Conference, sponsored by Bendix Scintilla Div., Sidney, N.Y., Aug. 20-22.

Western Electronic Show and Convention, Cow Palace, San Francisco, Aug. 20-23.

Experimental Aircraft Assn., annual fly-in and convention, Curtiss Wright Airport, Milwaukee, Aug. 30-Sept. 1.

SEPTEMBER

Royal Aeronautical Society and IAS 6th International Aeronautical Conference, Folkstone and London, Sept. 1-15.

SBAC annual air show, Farnborough, England, Sept. 2-8.

IATA annual general meeting, Madrid, Sept. 9-14.

ASME fall meeting, Hotel Statler, Hartford, Conn., Sept. 23-25.

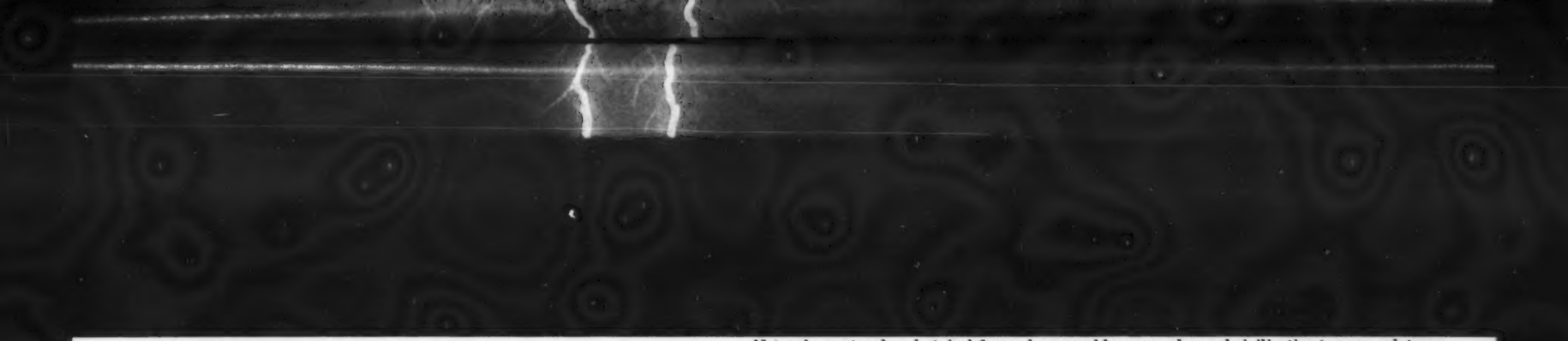
SAE Aeronautic meeting, Aircraft Production Forum and Aircraft Engineering Display, Ambassador Hotel, Los Angeles, Sept. 30-Oct. 5.

OCTOBER

National Business Aircraft Assn., 10th meeting and forum, Denver, Oct. 2-4.

International Northwest Aviation Council, annual convention, Palliser Hotel, Calgary, Oct. 6-8.

International Union of Aviation Insurers, annual general meeting, Amsterdam, Holland, Oct. 8-11.



Nature's spectacular electrical forces, harnessed by man, advanced civilization to a new plateau

THE AWESOME FORCES OF ATOMIC ENERGY WILL BE PUT TO WORK, AS ELECTRICITY WAS, TO ENRICH THE WORLD. TODAY, IN NORTH GEORGIA, LOCKHEED SCIENTISTS ARE TAKING FIRST STEPS TOWARD DEVELOPING FOR THE USAF A NUCLEAR-POWERED PLANE, ABLE TO FLY AROUND THE WORLD ON A HANDFUL OF ATOMIC FUEL.

LOCKHEED *means leadership*

BALLISTIC MISSILE RESEARCH & DEVELOPMENT • ROCKETRY • WEAPON SYSTEMS MANAGEMENT • NUCLEAR-POWERED FLIGHT • ADVANCED ELECTRONICS • ANTI-SUBMARINE PATROL AIRCRAFT • LONG RANGE EARLY-WARNING RADAR CONSTELLATIONS • JET FIGHTERS • JET TRAINERS • COMMERCIAL & MILITARY PROP-JETS • LUXURY LINERS

SPOTLIGHT

Boeing-Wichita reportedly is in the mockup stage of developing a low-altitude supersonic medium bomber that will use the "toss" and "over-the-shoulder" bombing techniques recently demonstrated by the B-47.

Prospects are good for large-scale Navy orders for Temco's TT-1 jet trainer, despite current commitments for only 14 evaluation aircraft. An unofficial estimate pegs ultimate Navy procurement at 300 planes.

Convair is testing the B-58 fuel system in a full-scale mockup of a Hustler wing section which is rocked to simulate pitch and roll of the supersonic bomber in flight. Hustler fuel system is said to be a radical departure from other aircraft in that it has shallow tanks which cover a large area. Convair says system creates problems of fuel distribution—much like a person running upstairs with a pie plate full of water.

First Vertol H-21C assembled in Germany by Weserflugzeugbau GmbH has made its first flight. Defense Ministry has ordered 26 Workhorse helicopters for transport squadrons of Army air force.

CAA will add two instrument landing systems to its current purchases for resale to Union of South Africa for installation at Johannesburg and Pretoria airports. Move is first in a plan to replace English Marconi ILS equipment that has not given satisfactory service.

Air France's fleet of Caravelles and Bonanza Air Lines fleet of F-27 Friendships will use Wilcox Electric's space and weight-saving integrated Canari system of airborne electronics.

Bendix and Marconi reportedly are talking over plans to license Bendix production of Marconi's Doppler navigation system in the U.S. System has been in use on British military aircraft for some time. Marconi is believed pushing for Pentagon approval of declassification for airline use of the system.

First Comet 2E, powered by a pair of 10,500-lbs.-thrust Rolls-Royce Avon RA 29s, has made its first flight. Two Comet 2Es will build up flight hours on the new engine.

Recent Vortac decision has not dented sales of VOR stations to foreign countries. Ten European and Middle East countries and their colonies have made recent purchases and orders still are coming in.

Folland Aircraft has delivered four Gnat lightfighters to the British Ministry of Supply. Gnat now features power-operated slab tail with manual reversion by unlocking elevators.

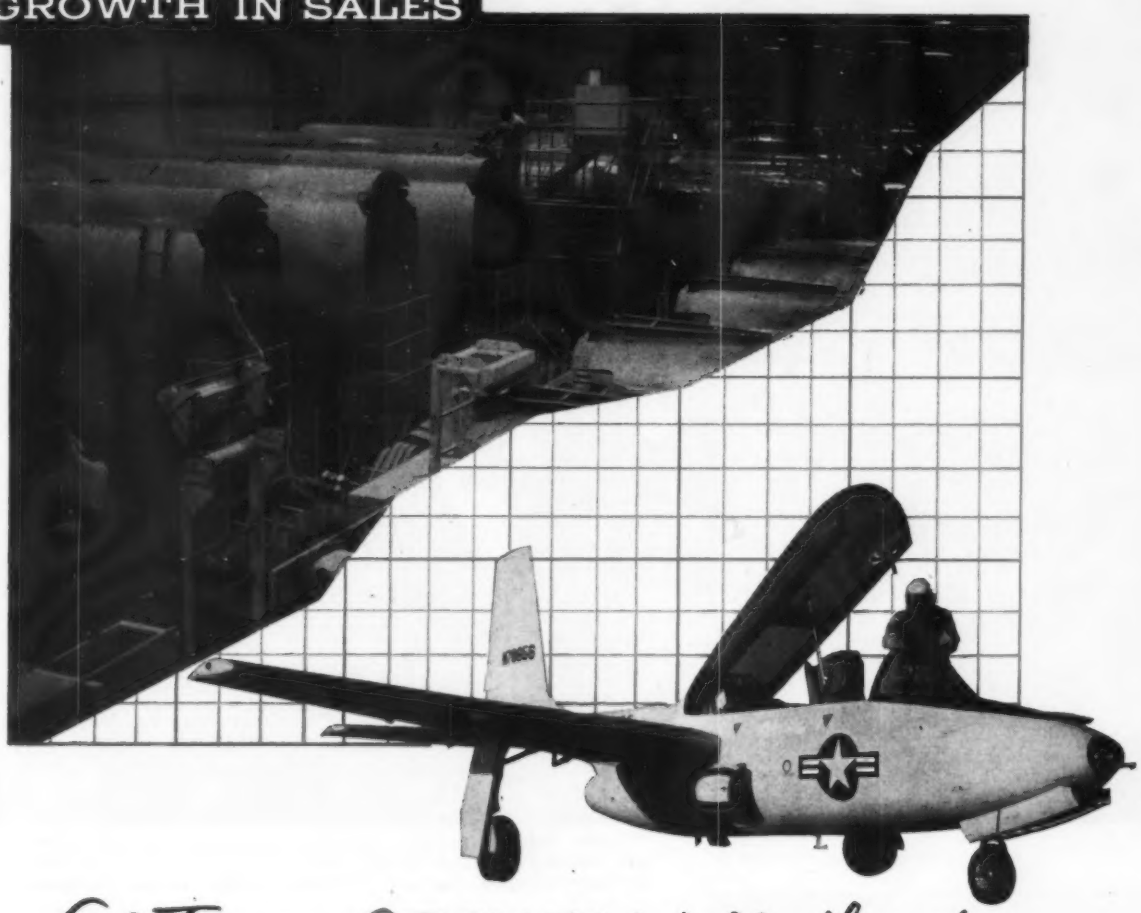
Production versions of the Boeing Bomarc interceptor missile are expected to cost about $350,000 each.

Convair and Air Force have started drop tests on the B-58's large detachable pod. First drop indicated results to both pod and the supersonic bomber were about as anticipated.

Hiller Helicopters has started assembling the X-18 STOL tilt-wing research project, using a C-123 fuselage and two Allison T40 turboprops. First flight will be late this year or early next.

Hypodermic needles are being used by Convair to give "shots" to its B-58 Hustler. Inoculation is prescribed when inspection reveals spots in honeycomb panels where bonding "didn't take." Small holes are drilled into the surface and adhesive is injected through needles. A small electric press applies pressure and heat to make bonding complete.

GROWTH IN SALES



At Temco GROWTH tells the story

Growth — in total sales, for example — tells the Temco success story.

During Temco's past decade of planned progress, sales have steadily increased from $5½ million in 1946 to a new high of over $90 million in 1956! At year's end, business backlog had almost doubled during 1956 to represent a net new business volume of $174 million for the year.

And the future looks even brighter . . . thanks to Temco's greatly expanded activities in research and development of jet aircraft, missiles and weapons systems.

Temco's steady growth in sales reflects customer confidence in the skills, initiative and engineering capabilities of a sound organization. The experienced engineer seeking new challenges will find here career opportunities designed to match his enthusiasm and ability.

Mr. Joe Russell, Engineering Personnel
Room 104-I, Temco Aircraft Corp., Dallas, Texas

Please send me complete details of the Temco story of unusual opportunities for experienced engineers.
I am especially interested in_____

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CITY_____ STATE_____

TEMCO
AIRCRAFT CORPORATION • *Dallas, Texas*

"Bernie" Fenwick, outside Friendship International Airport's Terminal Building. Directly behind him is a Constellation operated by Eastern Airlines, one of Pan-Maryland's airline customers.

"There's no ceiling on success when you fly with Shell!"

says G. B. Fenwick, Jr., President of Pan-Maryland Airways. P-M boosted its gallonage fiftyfold in six years as a Shell Aviation Dealer at Friendship International Airport, Baltimore

It's no wonder Bernie Fenwick is happy Pan-Maryland teamed up with Shell in April 1951. At that time, one truck was more than enough to handle their business. Three months later, thanks to Shell's help, they began making into-plane deliveries to the airlines.

Today, Pan-Maryland has 13 trucks busy fueling and servicing the airlines, private airplanes, jet fighters of the National Guard, police department aircraft, helicopters, military

and government-owned aircraft and dozens of corporate aircraft.

"We've got an extremely diversified operation here," says Bernie. "Pan-Maryland handles everything from Cubs to F4D Navy jets—from Mites to B-52's.

"Consequently, we handle the complete line of Shell Aviation Fuels, including Shell Turbine Fuels for jet planes and commercial turboprop airplanes.

"Shell also provides us with a full line of AeroShell lubricants, fluids and greases to fit our customers' needs. What's more, we get up-to-date technical advice from our Shell representative who's always at our service."

When Bernie talks about the services Pan-Maryland gives its customers, he emphasizes that delays are almost nonexistent. All pilots have schedules to meet and what they want most of all is fast, efficient, on-schedule service.

A "Customer's Service Report" is mailed to every flier who stops at the field. It invites comments and criticism of service, workmanship and courtesy. Replies like "Best service I've ever gotten—anywhere," "Excellent in every way," "Keep up the good work," are received every week from all over the country.

Bernie points out that their CAA Certified Repair Station is going to be finer than ever. A big new hangar will be completed soon and he plans a Class 4 shop there, with service crews qualified to work on every type of plane.

Other plans for the future include branching out into airline ramp service, setting up an aircraft sales department, building more hangars *and boosting gallonage still further.*

"After all," says Bernie Fenwick, "the sky's the limit with Shell."

Private planes get first-class treatment, too. Every civilian pilot who uses the field receives a "Customer's Service Report" which requests suggestions for improving service.

The Boeing 707 jet transport is fueled by Pan-Maryland with Shell fuel at Friendship International Airport after its recent record 3-hour, 48-minute transcontinental flight.

Bernie discusses plans for future expansion with Col. J. Colonna, Airport Director.

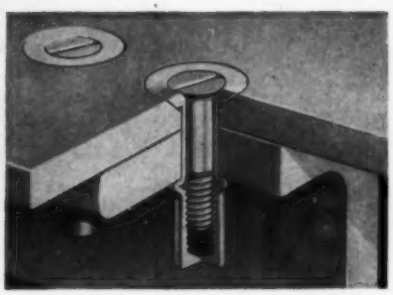
It pays to be a Shell Aviation Dealer

– and the Shell office nearest you will be glad to show you why

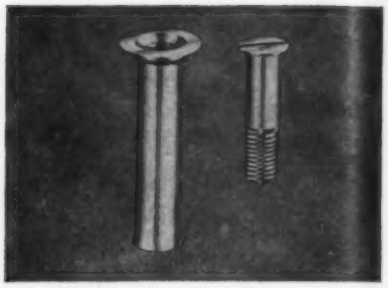
SHELL

At B. F. Goodrich, sealings are unlimited for liquids, gases and solids

PROBLEM—Designing the Grumman F11F-1 Tiger, using skin panels for integral wing tanks, required a strong leak-proof blind fastener.



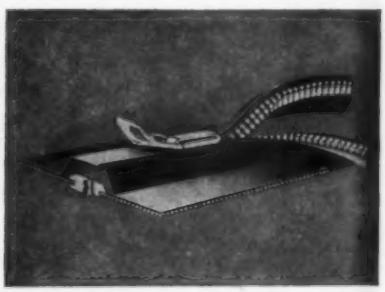
SOLUTION—Installed from one side, a Seal-Head Rivnut with rubber "O" ring provides a fuel-tight seal, withstands temperatures from −65° to + 225°F.



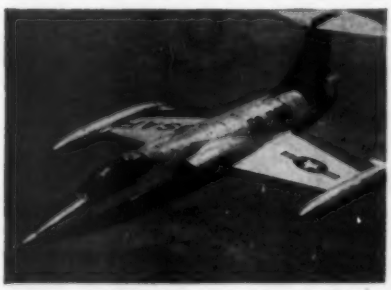
B. F. Goodrich Seal-Head Rivnut is approved for primary structure. Special high tensile screw adds reinforcement after installation.

PROBLEM—Baggage compartment panels in Lockheed's Super Constellations had to seal out air, yet open easily for servicing of equipment.

SOLUTION—B. F. Goodrich baggage panels with Pressure Sealing Zippers zip open quickly, form flexible, air-tight bulkheads that withstand abrasion, impact.

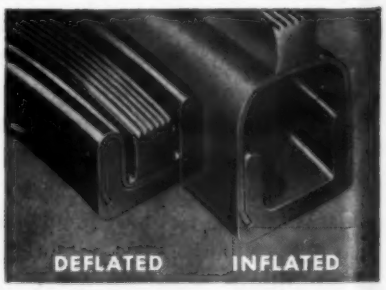


B. F. Goodrich Pressure Sealing Zippers have molded rubber lips that overlap with hairline precision. Three styles, two sizes, solve tricky sealing problems.



PROBLEM—The Lockheed F-104A required a lightweight canopy seal adaptable to compound curvatures and offering high flexibility at low temperatures.

SOLUTION—B. F. Goodrich seal inflates without stretching, gives longer service life and uniform sealing pressure at all points.



Ribbed striker bead is lifted by quick-action, reinforced diaphragm. When inflation pressure is released, seal snaps into relaxed position without vacuum assistance.

Whether your sealing problem concerns canopies, bomb bays, interior compartments, air ducts, access ports, aileron gaps or other areas, consult B. F. Goodrich Aviation Products. Our engineers have the technical knowledge and experience background to help you work out a successful solution.

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B.F.Goodrich Aviation Products

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JUNE 17, 1957—VOL. 21, NO. 2

AMERICAN AVIATION

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Directive 7200.4 . . .

Wilson decrees curbing procurement activities run into heavy fire from Senator Symington; Air Force supports Missourian's views

by Charles Schaeffer

AN ADMINISTRATION-IMPOSED ceiling that would hold defense spending to $38 billion in fiscal 1958, linked to major overspending, produced a two-horned dilemma last week which may force the Air Force into "drastic" weapons cutbacks next year.

This much, at least, can be distilled from the myriad charges, statements and contradictions tossed into the pot and set to boil before the Senate Appropriations Defense Subcommittee last week.

The Senate unit, which convened quietly to hear routine pleas for restoration of $1.2 billion in the Pentagon's authorization requests, abruptly found itself embroiled in a controversy evidently involving sums three times as great.

Air Force booster Stuart Symington, Democratic senator from Missouri and a former Air Force Secretary, bluntly accused Pentagon chiefs of "tailoring" weapons requirements to meet the Administration's plea for a balanced budget. In so many words he warned that he would not stand idly by and allow the Air Force to become "the goat" in a fiscal retrenchment.

Core of the dispute were two Pentagon orders, initiated by Defense Secretary Charles Wilson, which curb military procurement activities. The chief one, a directive issued May 21 under the number 7200.4, declared:

That all funds required for the manufacture of a given number of end items be apportioned for obligation before actual procurement is initiated. It (full funding) apparently also scratched over-programming for spares and components and the practice of pre-production procurement.

The second Wilson decree, issued without fanfare as a memo to service chiefs, slashed $500 million from planned military procurement of aircraft, missiles and other hardware in the final months of fiscal 1957. The across-the-board cut removed $100 million earmarked for the Army and $150 and $250 million, respectively, from the Navy and Air Force.

Sen. Symington pounced on the orders, charging the Pentagon had "manipulated" funds without consent of Congress. Brandishing figures which he said had been supplied to him by the Air Force, the Missouri lawmaker asserted 7200.4 would, in effect, delay or force cancellation of some $3.5 billion of long-range "installment" buying.

Air Force brass publicly agreed with the substance of the Symington contention. But they toned it down, predicting dire things only if the AF were compelled to stick to the strict letter of the order—an unlikely event.

As the public hearings reached a climax, Symington bore down with details. Based on data supplied by his own staff, the legislator declared that the Wilson order, if followed literally in 1958, could:

Block purchase of the B-58; eliminate the F-106; force substantial cutbacks in the F101B and the F105; eliminate one wing of C-130s; slow up the KC-135 jet tanker, and cancel the Snark, Matador, Falcon Rascal, and another missile faster than the Rascal.

For two days Symington, who is considered a likely 1960 Presidential candidate, dominated questioning that wound through a wilderness of complex procurement procedures.

One thing was clear to the Senator. The Administration's order to hold the line on expenditures at $38 billion and the Wilson orders amount to a "fiscal straitjacket" tailored to fit the Air Force.

Both Deputy Defense Secretary Donald Quarles and the Pentagon's top fiscal officer, W. J. McNeil, conceded spending was running over estimates.

W. J. McNEIL

SEN. SYMINGTON

Pentagon comptroller defended Wilson orders against senator's blistering attack.

But they differed on the degree. Under questioning, McNeil said fiscal 1958 expenditures could reach $42 billion—unless the brakes are slammed on. The figure jolted Quarles, who said he couldn't see how it was "valid."

But whatever the sum, Pentagon officials confirmed that programming was outracing expenditure forecasts. It was for this reason, McNeil indicated, that Secretary Wilson ordered contracting cutbacks.

Quarles, who admitted opposing both orders, bristled when Symington read press accounts suggesting the Air Force had been illegally practicing "partial financing" before the Wilson directive. "I believe we proceeded not only legally but ethically . . . and properly in Air Force contracting," Quarles replied.

Partial, himself, to Air Force "partial financing" that permits advance

purchase of plane components, Symington chided McNeil and the Pentagon for striking it down. The legislator flatly termed the technique "good business." And he agreed with the AF contention that it is often necessary to contract early for these components.

Air Force buyers say this system helps even when there is not enough money on hand to cover the cost of the initial aircraft themselves. It speeds up plane delivery, eliminating spare-parts delays, they say.

In gruelling all-day sessions, Symington once lapsed into the role of raconteur and parable maker. Not without his own reasons, he told Quarles about a man who wanted his will to include a $500,000 legacy for his wife.

"But you haven't got $500,000," the man's lawyer protested. "I know," said the will-maker, "but it will look good in the newspapers."

Amplifying his jibe, Symington said the Pentagon was apparently striving for the same effect—to have the presentation of its program look good in the papers. The Administration, he argued, is actually pursuing an "Alice-in-Wonderland" approach to defense budgeting by setting forth what it considers to be an adequate defense but then striking out funds to finance it.

What the Pentagon's anomalous gyrations have achieved, Symington cracked, is to make the Senate think the Air Force really doesn't need the funds trimmed by the House.

While Republicans didn't openly contest Symington's views on this, Massachusetts Senator Leverett Saltonstall repeatedly tried to steer the hearings back to "the subject of appropriations."

A Pentagon order curbing its own spending authority while its officials simultaneously ask Congress for more funds was certainly pertinent, Symington snapped back. The situation, he said bluntly, was "fantastic."

Beneath the uproar, and sandwiched between grilling by Symington, Sen. Ellender (D-La.), Sen. Chavez (D-N.M.), Sen. Thye (R-Minn.), Sen. Saltonstall (R-Mass.), and others, Pentagon brass posed one-by-one reasons why the Senate should restore $1.2 billion to the Defense bill.

McNeil defends unobligated balances

Pentagon comptroller McNeil defended big unobligated balances on the books at year's end, citing the House report, which said: "The primary reason for large unobligated balances is the practice of full funding of programs.

"Committee actions on requests of the Department are taken on the basis of programs presented for approval and programs approved . . . Although a program has been approved and funded for the procurement of a given number of aircraft, the entire number may not be contracted for at the same time, or even during the same fiscal year. The result is an unobligated balance on June 30 . . ."

Higher-than-expected rate of expenditures, McNeil declared, is pinned to:

Streamlined procurement and shortened lead-times.

New procedures that speed the bills to suppliers quicker.

Soaring cost of raw materials, wages and services, which are absorbing savings.

Quarles focused his attention on research and development needs, stressing that higher costs were jacking up the price of these programs.

In calling for restoration of $30 million trimmed from the three-service request, Quarles pointed out that total R&D support funds actually exceed the amount cited in the budget under this category. From all sources, including some procurement funds, the R&D treasury totals some $3.5 billion. A shift of available funds to R&D support, he said, is a trend.

Quarles reported that, after full consideration, Defense Department had decided to ask for $1,566,000,000 in R&D authority, more than the 1957 request, but less than the actual appropriation.

As the Pentagon turned for a second look at the monster it may have created in the twin curtailment orders, Senators debated aloud and privately the merits of money appeals besieging them. It was anybody's guess at week's end whether the Senate would restore all—or none of the pared-down Defense budget.

Department of Defense Directive No. 7200.4

Purpose of this directive is to insure orderly execution of the procurement programs of the Department of Defense within the appropriations and funds available.

Policy

A. No procurement of materiel, equipment, or work or services in connection therewith shall be directed or authorized unless adequate appropriations and funds are available under the applicable Department of Defense "Financial Plan" (1) for obligation, (2) set aside in the form of a commitment, or (3) set aside in a reserve account in an aggregate amount sufficient (a) to complete the procurement of a specified number of end items (including, where applicable, initial spares and spare parts) usable either in service units or for test and evaluation, or (b) when specifically provided for under a current apportionment of funds, to complete a pre-production program or procure components in advance of the fiscal year in which the related programmed end item is directed to be procured. Any procurement directed or authorized and not yet wholly consummated will be rescinded or modified to conform to the policy stated herein.

B. No contract or military interdepartmental procurement request or other order for procurement of materiel, equipment or work or services in connection therewith shall be executed (1) unless the officer directing or authorizing the procurement has determined in writing that such procurement is a part of a program directed or authorized under (A) above and (2) unless funds are available for obligation by the officer executing the contract or military interdepartmental order or other order in an amount sufficient to procure the specified number of items, components or the specified work and services.

C. When letter contracts and letters of intent are utilized to effect procurement for materiel, equipment, work or services in connection therewith, any amount committed but not yet obligated under such arrangements shall be regarded as a charge against the obligational authority apportioned under the financial plan for the current fiscal year, but any such amount will not be charged against the limits of the obligational authority otherwise established under the Department of Defense "Financial Plan" for the succeeding fiscal year.

D. Immediate steps will be taken to modify any contract, military interdepartmental procurement request or other order for procurement to conform with this policy. If for any reason there should be insufficient obligational authority available in fiscal year 1957 to conform all outstanding transactions to this policy, such amounts as may be necessary to do so will be a first charge against obligational authority to become available under the financial plan for fiscal year 1958.

E. For the purposes of this directive, all estimates shall be based upon the latest available firm prices. In the event firm prices are not available the best current working estimate of cost shall be used and adjustments will be made promptly when evidence of significant variation in costs becomes available.

Exceptions

The following are excepted from the provisions of this directive: 1. Procurements from Research and Development appropriations. 2. Such procurements as are specifically excepted upon approval of the Secretary of Defense.

March military contracts total $812,477,000

Military contract placements for aircraft and related equipment totaled $812,477,000 in March, including $47,648,000 for military assistance programs and $764,829,000 for direct U.S. Military use.

The March obligations brought cumulative obligations for the first nine months of fiscal 1957 to $6,734,027,000, including $6,286,358,000 for U.S. military use and $447,669,000 for military assistance.

By services, cumulative contracts awards during the July-March period amounted to: Army, $43,787,000 for military functions and $1,452,000 for military assistance; Navy, $1,487,863,000 for military functions and $10,414,000 for assistance; Air Force, $4,754,708,000 for military functions and $435,803,000 for assistance.

Why Air Force doesn't like Directive 7200.4

Secretary Douglas says Wilson order would have 'major disruptive effect' on procurement program

by Lois C. Philmus

DEFENSE DEPARTMENT has struck at USAF procurement practices of partial funding and overprogramming. Air Force cries of pain clearly indicate the blow hurts, but how critically will take some closer diagnosis.

Force behind the blow is Defense Department Directive Number 7200.4. Its issuance was apparently partially spurred on by the House Appropriations Committee report on the Defense bill.

In cutting the Air Force's overprogramming budget, the Mahon committee took a dim view of the practice. While recognizing its value for procurement of an "enormous multiplicity of items," the committee wanted it "definitely understood that this device is not to be used as a means of carrying such overprogramming forward from one year to the next as might be implied from the details of the budget presented this year."

But USAF says it is designed to cut down on expenses, regardless of outcome to the Air Force program. Full implementation of the directive, Air Force officials estimate, will have the effect of reducing by one-half the fiscal 1958 procurement program.

In a letter to Secretary Wilson soliciting relief from the order, Air Force Secretary James Douglas charged that it will have a "major disruptive effect" on the Air Force procurement program. "It is our view that the directive does not permit us to follow the practical procedures in accomplishing procurement on short leadtime with which your (Wilson's) office is thoroughly familiar." The order, he contended, will "substantially" reduce both fiscal 1957 and fiscal 1958 programs. He estimated reductions at $3.4 billion in aircraft and missiles and $800 million in major procurement other than aircraft.

Near spending hump

Even without these reductions spending will go up next year. Douglas formally requested Defense Department to raise fiscal 1958 spending objectives by about $4 billion. He predicted that this would be the spending "hump" and that procurement will stabilize at a lower level in subsequent years.

The higher spending estimates for both this year and next were pegged on: (1) Inadequate allowance made for more rapid expenditure rate under fiscal 1956 and 1957 programs because of reduction of aircraft lead time; and (2) use of development effort financing in ballistic and other missile programs.

The increased spending, he intimated, was necessary even in the light of some cost reduction programs now under way. He revealed:

That stretchouts and downward adjustments are now in effect on five aircraft and certain missiles. In addition to the Boeing B-52 and KC-135 already announced at 15 a month each, stretchouts are in effect on the Convair F-106, Republic F-105 and Lockheed F-104.

That Air Force agencies are directed to examine critically all contractors' overhead charged to Air Force programs with a view towards significantly reducing cost in this area. Overtime reduction in both industry and Air Force industrial establishments are already in effect.

That the Martin B-68 tactical bomber, the FBX advanced fighter and the C-132 were all canceled for fiscal reasons.

But while these measures are being taken, there are some items not included in the new budget that are shaping up as requirements. The XF-103 ramjet fighter and its dual cycle engine may have to be continued because of "strong commitments." The Rascal program is now found necessary for minimal operational capability. The Navaho, reoriented earlier this year along purely research lines, is under active consideration for continuance.

The deep slashes resulting from the directive are mostly aimed at curtailment of procuring long lead-time items without fully funding the end-item. Because of the reduction in lead-time, one airman pointed out that Air Force, in the last quarter of the fiscal year, has been able to give contractors from $5 to $10 billion to start preproduction work on new fiscal-year procurement contracts. The practice would be negated by the Directive and usurp the advantages of the lead-time fiscal reductions.

Air Force 'free-wheeling?'

Defense seems determined, however, to apply the rein to USAF spending. It is intimated that the Air Force is free-wheeling along—basing its procurement contracts on its own $20-billion program, rather than the Defense-approved $16.5 billion on which the appropriation is based. Air Force's answer is that it has based its procurement on what Congress appropriates, while Defense wants it to abide by the Defense-controlled apportionments.

Whatever the basic objectives, the Directive appears to place the Air Force in the position of having to justify each piece of hardware to be purchased. Although the directive obstensibly is now effective, AF has filed a 25-page justification of exceptions. It feels they have about 90 days for compromise or rescission. Air Force is hoping for a minimum of a much needed clarifica-

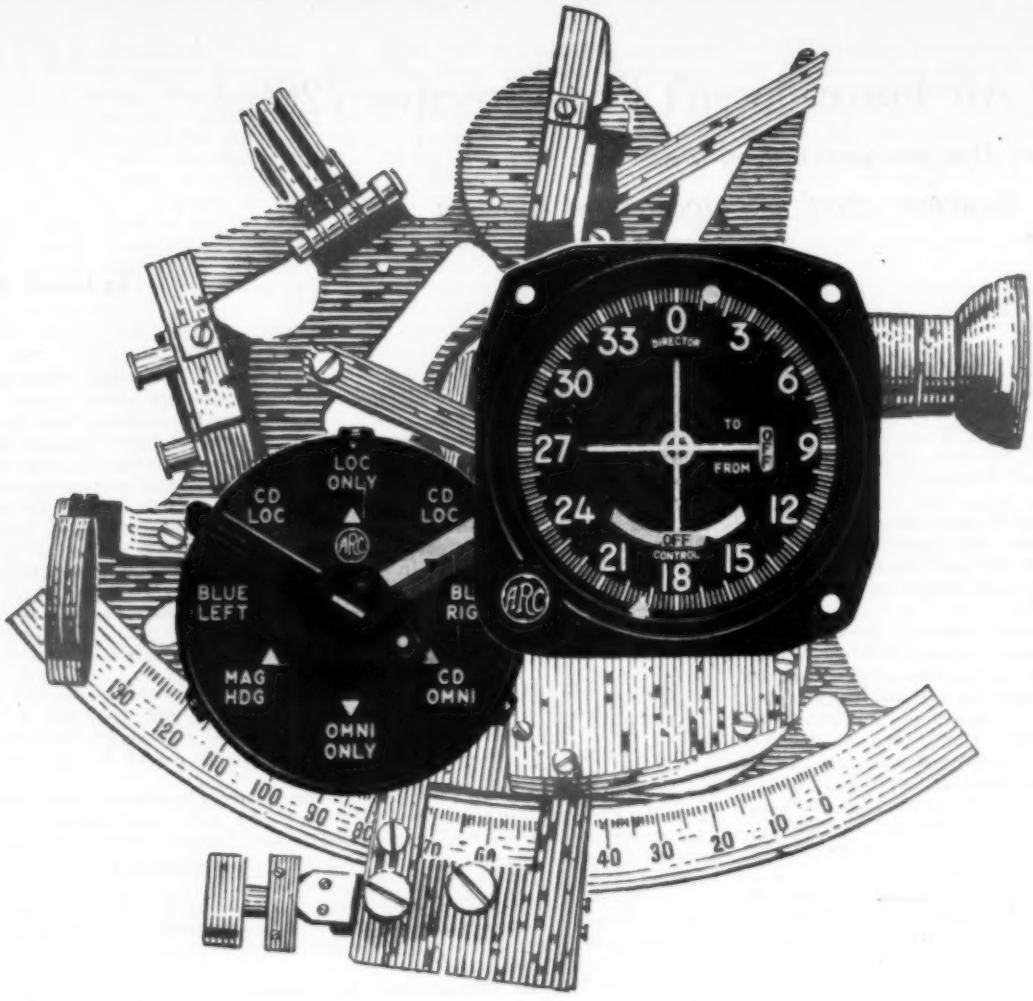
Mahon says there's no shortage of defense funds

Rep. George Mahon (D-Tex.), chairman, last week indicated the House Military Appropriations Subcommittee will study fiscal problems that have touched off a controversy in the Pentagon. He told AMERICAN AVIATION, however, he hoped Defense Department could settle the issues before it comes to that.

The Texas lawmaker urged that the spending hassle be considered apart from the Defense Appropriation bill. "Even with cuts, the Defense bill carried an appropriation of $33.5 billion in new money," he said. When the bill becomes law, he added, Pentagon will have available for expenditure in excess of $65 billion, of which $43 billion will be unobligated.

"So obviously, there is no shortage of funds for the Defense Department, and the action of the House in making a small cut in the Defense budget is not even remotely related to the major problem which is perplexing Defense officials," he said.

"The Defense Department," he continued, "has all the money it needs and the question is, therefore, not one of appropriation but one involving the rate of expenditure." Determination of this rate can be made only by the Executive Branch, he said.



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tion and even possible modification of the "wrist-slapping" Wilson order.

Seasoned observers are certain a compromise is both possible and necessary. But Air Force practices of proceeding with certain programs without securing the apportionment of all the funds probably will be closely curtailed no matter what the outcome.

The directive, on first interpretation, appears aimed at three major areas:

1. *The requirement that* a service have full apportionment for manufacture of a specified number of end items may force modification or, in some cases, termination of an undetermined number of USAF contracts. Air Force apparently has been committing itself to larger programs than it has appropriations for.

Certain B-52 procurement was cited as an example of the "buying on time" practice. Rather than terminate such contracts already out, USAF will be forced to fund them out of fiscal 1958 money—which will deeply cut into its new year program unless additional funds are made available.

The directive's requirement to make letter contracts "whole" will cut even further into the new year money. Some airmen feel that will give them only half of their fiscal 1958 program, whereas under their method there would be smoother, steadier rate of procurements and subsequent deliveries.

2. *Apportionments for long lead-time items* have been to a great extent in a general fund. The directive demands an accounting. It directs that preproduction and lead-time items may be procured before the fiscal year in which the programmed item is to be procured. However, the item must be "specifically provided for under a current apportionment of funds."

Military has long sought—and has had much support for—the need for flexibility in procurement of end-item lead-time items, components and support equipment. Estimating budgets 12 months to two years prior to actual expenditure while dealing with as many unknowns as today is the chief argument in its support, it is argued that the directive calls for "accurate crystal-ball gazing."

3. *Overprogramming* is completely ruled out by the directive and supported by Congress. But the Air Force has found that such a device improves management of its spares procurement. Experience has shown that 10% of all scheduled spares procurement drop out during the year because of delays, technical difficulties and revised requirements. By programming more spares than it intends to buy, the USAF is able to keep "even" on its spares program.

Whatever the outcome of one of the hottest service vs. Defense Department fracases, some facts of life are evident:

1. Administratively, the Defense Department will be hard pressed to watchdog each and every lead-time item.

2. If the full-funding concept is adopted in the literal sense of the directive the Air Force will need about a 25% increase in its new year appropriations. The only other alternative will be a slowdown in the Air Force strength buildup.

3. *The dispute* sits between two basic differences of philosophy: Procurement on a fiscal basis or procurement on an approved program. The very nature of military procurement demands the latter. Apparent compromise should be a more realistic wedding between the two, with criteria set at necessity followed by sound fiscal planning.

Here are details of Fairey FD-2, Britain's world speed record holder

LONDON—R. L. Lickley, chief engineer, and Peter Twiss, test pilot, have revealed design and flight-handling details of the 1,132-mph (world speed record) Fairey FD-2.

The delta planform, said Lickley, was chosen:

Because it gives the right relationship between sweepback and aspect ratio for constant airplane-moment characteristics right through to the stall.

The stall is stable.

It has low thickness-chord ratio (plus 60° sweep) combined with practical physical wing root thickness.

It offers optimum lateral stability, particularly at low speeds, with adequate damping in pitch, thereby making a tail plane superfluous.

The possibility of having control surface hinge-line at right angles to the fuselage improves control effectiveness.

Large-chord control surfaces were chosen to keep down high trim drag usual with delta wings. In order to avoid transonic control surface "buzz" and single-degree of freedom flutter the controls are not mass-balanced. The natural frequency of the controls is 50% greater than when mass-balanced and 1,000 lb. dead weight is saved.

Controls are irreversibly operated (without manual reversion) by duplicated Fairey Hydroboosters, the jacks being mounted on the most solid structure. A retractable Rotol ram-air turbo-hydraulic pump is fitted in the fuselage belly.

The large four-petal air brakes at the rear of the fuselage give minimum trim change at all speeds.

The wing structure was built to an accuracy of ±0.005 in. of the mathematical profile. Most of the wing is occupied by fuel. The essential structure consists of two torsion boxes; at the leading edge and aft of the main gear. This rear, and main, box has a thick skin which takes almost all of the wing bending loads. The wing was built "dry" and sealed by slushing.

The fuselage is based on a cylinder with minimum appendages—the cockpit being a very slight bulge. The combination of the cylinder with the short air intake bulges approximates closely to area rule.

The Rolls-Royce Avon had to be mounted in a volume "where the maximum clearance between engine and fuselage skin is less than six inches." It is removed after breaking the rear fuselage near the fin; the only airframe services disconnected are for air brakes and rudder. Engine removal simplicity has paid off in flight time.

Lickley revealed that the FD-2 has doubled-shock engine air intakes.

Prime problem is to match engine mass flow requirements over whole speed range with lowest drag losses and best possible pressure recovery without spoiling general aerodynamic configuration.

Overhung entry lips achieve this: the extended sharp upper edge generates a decelerating conical shock, after which the airflow is rendered subsonic by the weak normal shock caused by the blunt lower edge. The shock system is thus kept outside the duct and "buzz" eliminated.

Pressure recovery at Mach 1.4 is raised by 6-8%. Intake area was chosen to give full air mass flow at the critical transonic case. Static running airflow is supplemented by an auxiliary slot in the fuselage belly with a suction-operated door. The fuselage boundary-layer bleed is essential for supersonic efficiency. To overcome a symmetric duct choking, these continue individually up to the compressor.

Giving the piloting angle, Twiss said the stalling incidence of the FD-2 is between 20° and 25° which led to the successful solution of the 10° cockpit droop for landing vision. Later he said that in level flight at 40,000 ft. optimum downward visibility is a small cone 20/30° either side of the nose.

Stability within the present flight envelope has been so good that no artificial stability devices have been required. Since a one-inch stick displacement can produce ½ G near the stall and 5 to 6 G at 500/600 knots, there is a variable gearing to maintain similar "G" and rate-of-roll relationships to displacement at both ends of speed range.

Twiss emphasized that the FD-2 becomes supersonic very smoothly and that "it is time to say that after a gentle nose-down trim change at about 0.95 M there is no indication that the aircraft has slipped from high subsonic to supersonic flight."

Inspecting T2J mockup: (in cockpit) Tom Clancy, Engineering Manager Trainer Projects, NAA Columbus; (left to right) executive secretary Lloyd A. Chacey, retiring president Alfred H. Sanborn, president Elmer S. Barrett, all of Ohio Society of Professional Engineers.

Invitation to the best engineers in Ohio (...or anywhere else!)

This is a mockup of the new T2J Navy jet trainer, designed and engineered by the Columbus Division of North American Aviation.

Displayed at the invitation of the Ohio Society of Professional Engineers at its 1957 annual meeting, the T2J is a graphic example of U. S. Naval aircraft engineering progress. It is the logical follow-on to the long line of distinguished standard trainers for which North American has been famous for over a quarter of a century. Designed as a basic trainer for jet pilots in all branches of the Armed Services, the T2J's performance is equal or superior to the nation's first jet fighters.

As an engineer, you can appreciate that many of our interesting projects cannot be exhibited in a public place. The performance and ability of these new aircraft startle the imagination of even the most advanced engineers. The requirements they impose offer challenges to every engineer currently working on them. They will do the same for you.

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THE COLUMBUS DIVISION OF
NORTH AMERICAN AVIATION, INC.

U.S. manufacturers out in front at Paris air show

by Anthony Vandyk and Jean-Marie Riche

PARIS—The increasing emphasis on missiles and jet aircraft in the major countries of the world was reflected in the exhibits at the International air show here. The Paris "Salon" lived up to its reputation as the most representative air show held anywhere. Nowhere else in the world has there ever been assembled so many different types of aircraft and missiles from so many different countries.

Although primarily a French show, the 1957 Paris "Salon" was almost dominated by the U.S. exhibits. Perhaps the No. 1 attraction was the Northrop Snark intercontinental missile which was flown here in two USAF C-124 Globemasters.

The giant Douglas transports and a Lockheed C-130 commanded particular attention from European visitors.

Among the numerous other U.S. military aircraft on static display that drew large crowds was the North American F-100 "Spirit of St. Louis" that flew over Lindbergh's route in just over six hours. Another special flight to the show was made by a DC-7C of KLM that linked Long Beach with Paris nonstop in under 22 hours.

In the exhibition hall U.S. engine manufacturers drew big crowds with such new powerplants as the Pratt & Whitney JT-4 (civil J75) and the General Electric CJ805 (civil J79) and T58. The absence of Allison and Lockheed was commented on by many visitors. On the North American stand a scale model of the NAA-249 made its first public appearance. A tremendous drive is clearly being made to secure export sales of this advanced jet trainer.

The U.S. was not the only foreign nation to unveil new products at Paris. The British, for example, displayed the Bristol Bobbin missile and the de Havilland Gyron turbojet with afterburner (25,000 lbs. thrust) for the first time.

The Czechs brought the Avia-built version of the Illyushin 11-14 transport (AMERICAN AVIATION June 3, p. 23) to Paris as well as several smaller aircraft.

The Poles featured the PZL SM1 three-place helicopter.

The Spaniards brought the Hispano Aviacion Saeta jet trainer.

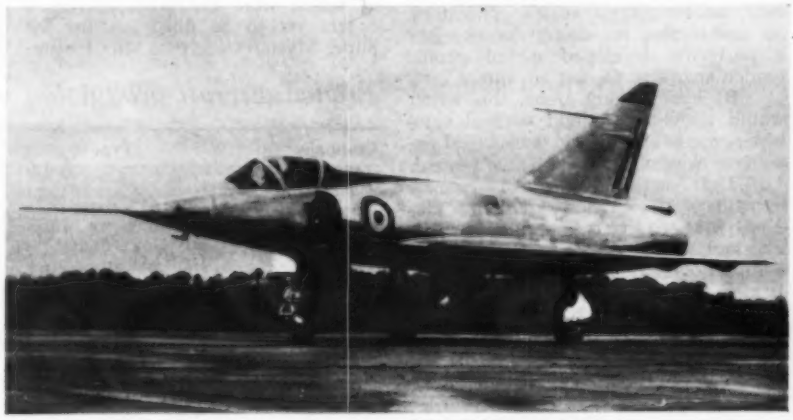
Fokker flew the latest prototype of the F-27 transport for demonstration.

The Germans had the Dornier Do 27 liaison aircraft on hand. These are but a few examples of the non-French "novelties" on display at the show.

Taking in the French aircraft industry after briefly reviewing the foreign highlights is the way the French would want it. Traditional French hospitality demands that the visitors be taken care of first and at the "Salon" no efforts were spared to make the foreign exhibitors and visitors welcome. At the end of each day the rows of empty bottles testified to the cordiality of the French hosts. Organizationally the show was very good, reflecting many months of hard work by the organizers, the French AIA (USIA).

As well as being a wonderful host, the French aircraft industry once again gave conclusive proof that it is firmly established as a productive force (accompanying list shows the details); French realism is being applied to give the industry a new look in the light of changing defense requirements.

Recently the French government outlined the nation's new defense policy. This calls for the continuation of production of the best conventional aircraft while giving top priority to the development of the weapons of tomorrow, operational missiles. For defensive missions the Dassault Super Mystere B2 and Sud-Aviation Vautour will give way to the Dassault Mirage III (rocket plus jet power) with its air-to-air missile and subsequently to a ground-to-air missile. It is unlikely that Sud-Aviation's Trident or Durandal will be selected for production.



MARCEL DASSAULT Mirage III, rocket-plus-jet-powered fighter.

AMERICAN AVIATION had a corps of five editors on hand to cover the International Air Show at Paris May 24-June 2. They are shown visiting the static displays. From left: James Hay Stevens, London editor; Anthony Vandyk, international editor; Wayne W. Parrish, editor and publisher; Jean-Marie Riche, Paris editor, and Wolfgang Wagner, correspondent in Germany.

French military aircraft feature smooth finish

By James H. Stevens

PARIS—Most immediately striking technical feature of the French exhibits is the outstanding finish of the high-speed military airplanes—ranging from good on the two production Vautour twin-jet fighter-bombers through the Durandal delta dual-power fighter prototype to outstanding on the Dassault Super Mystere level supersonic fighter.

The plain, unfilled, unpainted heavy-gauge skin of the latter is so near perfection that it accentuates the purity of the airframe. Evolved by a lengthy small-step modification process from the Ouragan of 1951, the Super Mystere is the only supersonic airplane which has no wing-gimmicks whatsoever; no fences, no vortex generators, no saw-tooths, no droop snoots—just a perfectly developed airfoil profile graded spanwise to best advantage.

By eye gauging alone, this writer would guess at a slight conical camber—or what formerly was called incidence washout.

The Fouga CM 175 Naval development of the French Air Force CM 170R Magister jet trainer is as sleek in line and fabrication as its faster fighter compatriots. Recently fully tested at the British RAE/Bedford's navy test field, the CM 175 has been cleared for catapult launch at 5.7g and 175 kts (only 90 kts are required at max. gross) and for hook arresting.

The Naval aircraft apart from the addition of hooks, wing beefing and addition of high energy absorption gear has sliding canopies. To overcome airflow pulsation with open hood, small flaps the size of a playing card open each side of the windshield frame.

Morane Saulnier, one-time rival for the jet trainer contract for the French Air Force and main contractor for the Magister production program, is now in production with the MS 755 Paris twin-jet, four-seat personal airplane which toured the US last year. Around 50 are being built for the Air Force and 48 for Argentina—12 of the latter will be delivered as major assemblies and 36 as detail parts for final assembly in a new plant under Morane Saulnier technical supervision.

The MS 1,500 military liaison airplane with a new Turbomeca turboprop, the Bastan, was shown in model form—narrow-gutted, tandem, two-place low-wing monoplane, with a balloon canopy. With maximum crew armor, it is intended to carry a light armament of four machineguns or two 117-lb. bombs or two ASMs—either Matra or Nord S.11. A prototype is being built at the Puteaux Paris plant.

Morane Saulnier also showed a model of the MS785 10-seat four-jet (Turbomeca Gabizo) executive—but this seemed more of a pipedream than anything else.

Probably most significant powerplant development is the cooperative work of the SNCA du Nord and SNECMA on turboramjets. Highly classified in detail, the principle is clear. The centerbody of the ramjet is used to house a normal-size turbojet which acts normally save that it is surrounded by a duct of air. At high speed, fuel is injected aft of the turbojet tailpipe where it ignites in the combined stream of jet efflux and ducted ram-air. It is the logical development

Report on French aircraft industry's activities

The French aircraft industry delivered 1,099 aircraft of all types during 1956 and at the end of the year had a backlog of orders and projected orders for 2,481 more.

Greatest production during the year was of the Dassault Mystere IVA, 325 of which were delivered, leaving a backlog of 95 still on order. Other large orders yet to be filled are for 300 Air-Fouga 170R Magisters, 370 Dassault Super Mysteres and 304 Max Holste 1521 Broussards.

French aircraft production status (*January 1, 1957*)

Company	Type	Powerplant	Ordered	Delivered
Military				
Air-Fouga	170R Magister	2 Turbomeca Marbore II	350	50
	175 Magister Marine	2 Turbomeca Marbore II	30	
Breguet	765 Deux Ponts	4 P&W R2800	15	
	1050 Alize	1 Rolls Royce Dart	105	4
Dassault	Mystere IVA	1 Hispano Suiza Verdon	420	325
	Super Mystere B2	1 SNECMA Atar G	370	
Max Holste	1521 Broussard	1 P&W R985	354	50
Morane Saulnier	733 Alcyon	1 Potez 6D	185	116
	760 Paris	2 Turbomeca Marbore II	50 100	(Projected)
Potez	75	1 Potez 8D-32		
SNCAN	Nord 2501 Noratlas	2 SNECMA Hercules	228	140
	NC 856	1 SNECMA Regnier 4L-04	110	110
	Nord 3202	1 Potez 4D-30	100	(Projected)
Sud-Aviation	SE 3130 Alouette II	1 Turbomeca Artouste	200	32
	SO 1221 Djinn	1 Turbomeca Palouste	125	25
	Vertol H-21	1 Wright R1820-103	100	26
	Aquilon	1 D.H. Ghost	101	85
	S-55	1 P&W R1340	66	52
	S-58	1 Wright R1820-84	150	
	SO 4050 Vautour	2 SNECMA Atar 101E	149	9
Commercial				
Sud-Aviation	SE 210 Caravelle	2 Rolls Royce Avon RA29	12	
SNCAN	Nord 2502 Noratlas	2 SNECMA Hercules and 2 Marbore II	4	4
Light Planes and Gliders				
Aubert	PA 204 Super-Cigale	1 Lycoming 150	8	4
Boisavia	B-601L Mercurey	1 Lycoming 150	35	25
Breguet	901S and 904 (Gliders)	none	60	10
Fauvel	AV-36 (Glider)	none	...	...
Wassmer	Jodel D.120	1 Continental 90 hp	100	32
		Small-Scale Production		
Hurel-Dubois	HD 34 (IGN)	2 Wright 1500 hp	8	
		Pre-Production		
Potez	75	Potez 8 D-32	15	
SIPA	1000 Coccinelle	Continental 90 hp	10	
	1100	2 P&W R985	10	
Sud-Aviation	SO 9050 Trident	2 Viper or 2 Gabizo and 1 SEPR	10	

MORANE-SAULNIER model of transport project designed around four Turbomeca Gabizo turboprops.

of the afterburner yet, paradoxically, it then becomes a single-shaft by-pass engine.

The latest of Jean Galtier's supersonic deltas, the Nord Griffon II is now flying with a SNECMA Atar turboramjet. SNCA du Nord has pursued a 10-year program of ramjet development all the way from small subsonic units to the ST 450 19-in. diameter free-flight model and it is this knowhow that has gone into the turboramjet development.

Numerous guided missiles and test models on show suggest the French are pursuing most lines of development. It is impossible to obtain reliable news of results. The Sud-Aviation rocket and jet missiles appear to be of transonic configuration having regard to the wing sweepback used. The Bronzavia missile ram-air turbine has just been licensed to General Electric for US production.

For offensive purposes the Vautour bomber will be replaced by a "Super Vautour" or by the Mirage IV carrying the atom bomb. For ground attack the Dassault Etendard IV is likely to win out over the Breguet 1100 and the Sud-Aviation Baroudeur. Later France's offensive weapon will be a ballistic missile but this will not be ready until 1965.

In the transport field production of the boxcar-like Nord 2501 Noratlas, Holste Broussard and the Breguet Deux Ponts will continue.

Helicopter production will center around Sud-Aviation's Alouette and Djinn and the license-built S-58. The main French naval aircraft will be the Dart-powered Breguet 1050. Naturally there will be a continuing program of trainer production.

On the civil side, the No. 1 aircraft is Sud-Aviation's Caravelle jet transport. The Holst Super Broussard also has good prospects of becoming an important production item being a rugged twin-engine bush aircraft. Hurel Dubois is building a series of HD 34 survey aircraft derived from the HD 32 "DC-3 replacement" but this will only be a small production run.

It is in the experimental field that French industry particularly shines with such brilliant aircraft as the Leduc 022 and Nord Griffon (jet plus ramjet) and numerous very promising missiles. France can indeed be proud of her place in world aviation today.

Canada orders Firebee

Royal Canadian Air Force will use the Ryan KDA-1 Firebee target drone. No delivery dates have been released. KDA-1 is similar to the turbojet Firebee used by Navy. Canada is first foreign country to order the drone.

Generating machine simplifies production of impellers for rocket engines, fuel pumps

A conic spiral generating machine to simplify the production of impellers for rocket engines and fuel pumps has been designed and developed by Nationwide Engineering Service, Inc., Culver City, Calif.

The first production machine is being built for Hydro-Aire, Inc. for use in the manufacture of its line of HY-V/L fuel booster and transfer pumps. These pumps are used on the North American F-100, Lockheed F-104, Chance Vought F8U-1, Boeing B-52 and other jet aircraft.

Basic component of the Hydro-Aire pump is a centrifugal mixed flow type of impeller, actually a spiral vaned cone. Due to critical dimensions and long thin vane cross sections, the impeller has been a difficult part to manufacture.

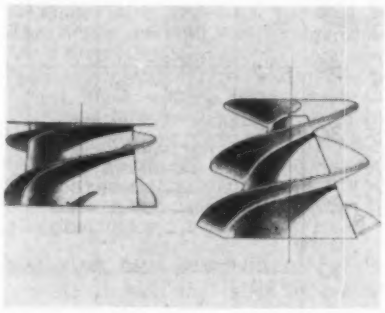
The new machine designed by Nationwide Engineering has great versatility and is capable of cutting through a wide range of feeds, speeds and depths of cut. It can machine almost any metal and it is easily set up. Three simple linear cams control the hub contour, lead and vane cross-section. By changing the cam contour, the hub or vane contour and lead can be varied.

Hydro-Aire's chief manufacturing engineer, Edward Cook, says substantial reductions in set-up time and floor-to-floor time will be accomplished by the new machine, reducing manufacturing cost of the impeller by as much as 40%.

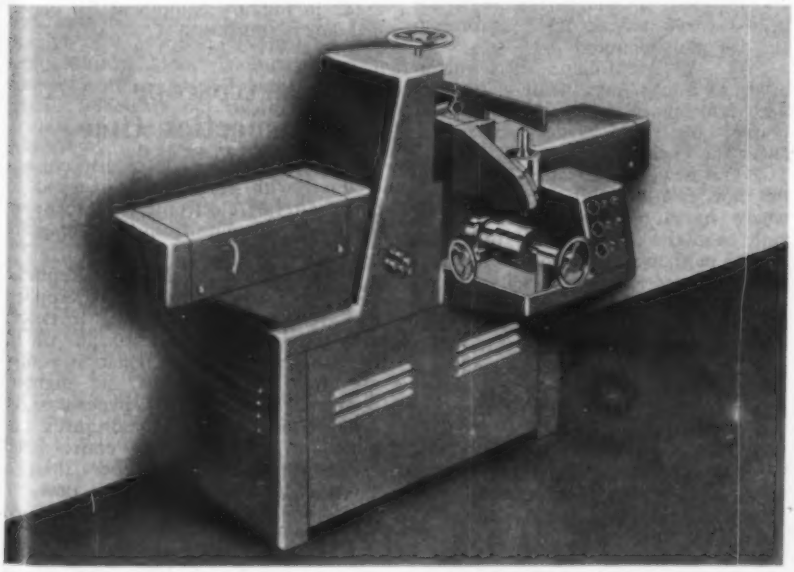
The prototype of the special purpose machine—somewhat smaller in size—is being used by the Houston-Fearless Corp. in the manufacture of an impeller for an Aerojet-General Corp. rocket.

The vane generating machine—Model 6-6-720—marks Nationwide Engineering's entry into the production field. Heretofore, it has specialized in the research, development and design of mechanical, hydraulic, pneumatic and electrical components, particularly in the aircraft field.

It is estimated an impeller that would take an hour to make by other means will take eight minutes with the new machine.



DRAWINGS SHOW impellers manufactured automatically by Nationwide Engineering's new conic spiral generating machine. At left, impeller for Aerojet rocket; at right, impeller for Hydro-Aire fuel booster pump.



IMPELLER MANUFACTURE is simplified by this Model 6-6-720 vane generating machine developed by Nationwide Engineering Service, Inc.

Descaling process saves Temco $5,000 monthly

Temco Aircraft Corp. has patented an electrolytic descaling process which is saving some $5,000 monthly by decreasing the number of rejected titanium parts.

Called "Ti-Brite," the process was developed by J. J. Dailey, a Temco chemical engineer.

The process eliminates the need for expensive heating equipment for the molten-salt-solution method previously used. Number of employes required for the operation has been cut from eight to one. Hand-scrubbing of parts has been eliminated and the number of parts rejected because of unevenly etched surfaces has been reduced.

"Ti-Brite" leaves the titanium parts with smooth, natural surfaces, according to Dailey. The descaling is so delicate that machining marks are still visible after processing.

The "Ti-Brite" process involves immersing the titanium or titanium alloy part as a cathode in an electrolytic bath and passing a direct current of 6 to 36 volts between it and an anode. The bath consists of about 1% by volume of a 48-70% solution of hydrofluoric acid, about 4% by volume of 34-46° Bé. nitric acid, about 20% by volume of 60-66° Bé. sulfuric acid and 3 to 5 oz./gal. of a sulfate selected from the group consisting of the sulfates of the ferrous metals and aluminum.

Specs. for Ti-Brite process

Material	Concentration
Hydrofluoric acid (48-70%)	1% by volume
Nitric acid (38-46° Be.)*	4% by volume
Sulfuric acid (60-66° Be.)*	20% by volume
Water	75% by volume
Ferrous sulfate or aluminum sulfate	3/5 oz./gal. of other ingredients

Sulfuric acid and sulfate serve to inhibit reaction of solution on base metal and prevent formation of black smut after oxide scale has been removed.

**Baumé scale of specific gravity.*

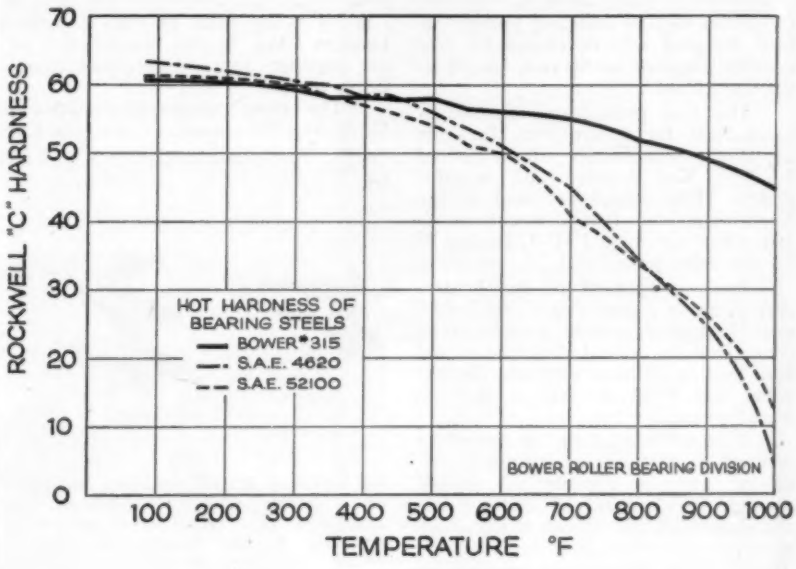
The anode is titanium or a ferrous metal, and the process can be accelerated by supplying the current in one direction for a minute or more, reversing it for two or three minutes and then applying it in the first direction until the oxide coating becomes loose.

With the new process, titanium articles of substantially any size and configuration can be freed of oxide scale that forms in the temperature ranges of 400° to 1,300°F. The article is made clean and uniformly bright without severe etching, undue gauge loss or costly hand work.

The process is continued until visual inspection shows the part to be free of oxide scale or the remaining scale is loose enough to be removed by a running-water rinse.

PRODUCTION

New steel alloy said to assure supply of jet-engine bearings in emergency



Development of a new "99% native" steel practically assuring the supply of jet-engine bearings in time of national emergency has been announced by Republic Steel Corp.

The new alloy, identified as Bower 315, is being produced by Republic for the Bower Roller Bearing Division of Federal-Mogul-Bower Bearings, Inc. It requires no imported components such as tungsten or cobalt.

Principal alloying elements of the steel are 3% nickel, 1.5% chromium and 5% molybdenum.

O. W. McMullan, chief metallurgist at Bower, says the alloy matches the performance of steels using tungsten or cobalt and its development reduces the chances of a scarcity.

The new bearing steel is used on the hot end of military jet engines where operating temperatures go as high as 500°F. While steel ordinarily softens permanently at elevated temperatures, Bower 315 recovers its original hardness when cooled to room temperatures after heating as high as 1,000°F.

Key to the performance of Bower 315 is the heat treatment covered by a Bower patent.

Races and rollers for bearings are held at 1,000°F as a final step of the heat treatment. Since this temperature exceeds the operating temperature of the bearings, Bower 315 provides stability and prevents dimensional and hardness changes in bearings in service.

Coefficient of thermal expansion of Bower 315 is close to that of the steels used for shafts and housings. This prevents difficulties which could be caused by differential in expansion over the wide range of operating temperatures, McMullan said.

On test stands, bearings made of the new alloy have operated without failure at temperatures up to 600°F.

Bower reports that the new alloy is also used for rocket-motor assemblies. The company would not disclose any specific uses saying only that it is used "in military equipment for classified defense purposes."

RF spectroscope cuts inspection time

A radio frequency spectroscope is credited with cutting time needed to check aircraft electronic equipment on the production line from three or more days to half a day.

The device, developed at Republic Aviation Corp. and built by Applied Research, Inc., is being used to detect and eliminate interference in radar, communications and navigation equipment of newly-built jet fighter-bombers. Basically a hypersensitive radio connected to the aircraft's antenna, it can check an entire band range simultaneously rather than a single channel or station at a time.

An unwanted signal is detected quickly and indicated as a wavering line on the set's scope. Source of the static is then determined and eliminated before the aircraft is delivered.

Feedback from a servo valve: $10 million in sales

In 1951, Bill Moog was pushed into the manufacturing field; today he heads a multi-million-dollar business

by William Beller

IN 1951 a servo valve that nobody wanted to produce opened the doors of the Moog Valve Co., East Aurora, New York. This year the company will have sales totaling just under $10 million. Variations of the original valve, which converts an electrical signal to hydraulic power, are standard equipment today in most major missiles and military jet aircraft.

Chief uses of these valves are in hydraulic servo loops for fire-control systems, aircraft autopilots and missile flight stabilization systems.

Moog recently took a giant step forward in the servo field when it developed a valve that combines the features of a pressure-control and flow-control valve. Biggest use is expected in systems that drive and position radar antennas.

Aptly called the "P-Q" valve, the device responds to an electrical signal by yielding a proportional pressure output when no oil is allowed to flow and a proportional flow output when pressure is not demanded by the system's load. One such valve has already been shipped to Westinghouse. Other companies are asking for engineering details.

Working on valve for Navaho

Expecting that supersonic vehicles will soon be demanding quantity production of valves able to withstand high temperatures, Moog is engaged in a development program for the Navaho missile. Growing out of this work is a valve able to run on 3,000 psi oil at 500°F in an atmosphere whose temperature can go up to 1,150°F.

These figures are far superior to those for conventional valves which usually run on oil at 250°F in an ambient temperature of about 400°F.

William C. Moog, Jr., 42, president and largest stockholder of Moog Valve, studied engineering at Rutgers. During World War II, he worked as a research engineer for Bendix Aviation. From Bendix, in 1946, he took a job at the Cornell Aeronautical Laboratory (CAL), Buffalo, N. Y.

In 1948, the military anticipated the need for an advanced type servo valve able to survive in the rugged environments experienced by guided missiles. What was required was a fast-acting, lightweight, high-pressure valve able to replace the sluggish and relatively heavy ones then being used.

The problem was given to CAL to solve, which in turn assigned it to Moog. He invented the prototype of an adequate valve and CAL patented it. The design met all the requirements for a successful component except one. Nobody wanted it. The guided missile program was still too young.

Then in 1950 Bendix ordered four of the valves from the Laboratory. Since CAL was set up for research alone and was not interested in production projects, the order was turned over to Moog to fill.

Started in own basement

He showed the order to several manufacturing companies but none of them thought the market sufficiently large to warrant building the units. Moog decided to take a six months' leave from CAL to do the job himself. He found a machine shop in Batavia, N. Y., that agreed to make the valves and also agreed to wait for its money until Bendix paid, a most happy arrangement.

The first valves were assembled in Moog's basement and tested at the Laboratory. At the same time, Philco who was sub-contracting radar equipment, heard of Moog's valves and ordered 75 units, a $30,000 contract.

At this point, Moog decided to incorporate. Among his assets in 1951 he numbered (1) his engineer brother, Arthur Moog, 33, who would leave his job in the Midwest to supervise manufacturing; Lewis Geyer, 31, then of CAL, who would direct engineering. (2) A royalty-free license from CAL to manufacture the valves. (3) A cash balance of $3,000 loaned to the corporation by its officers, and (4) a strong belief that there would soon be an expanding market for the valve.

First year sales hit $200,000. Second year sales doubled the first year's

COMPANY BEGAN operations in 1951 in a 1,500-sq. ft. aircraft hangar.

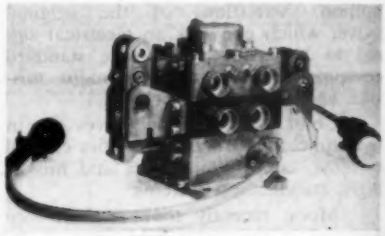
MOOG VALVE today has 67,000 sq. ft. of plant area. (Original hangar at left.)

and, in the third year, a $1-million target was bettered.

Moog has doubled its sales every year since its incorporation. Fourth year: $2.5 million. Last year: just under $5 million. And this year, nearly $10 million is expected, plus a $7.5-million backlog.

Today, the company has 700 employes (average age, 31) and 67,000 square feet of plant area. This is a far cry from the original staff of four and the original building, which was a converted aircraft hangar of 1,500 square feet.

Moog Valve has no time clocks, employs two full-time men to dispense free coffee to employes and pays ten percent of its total corporate profits before taxes to its employes as bonuses. These are based on a formula whose factors include employe's salary and seniority.



MOOG dual-input valve is used on a Convair fighter-interceptor.

Corporate financing comes from reinvesting profits, bank assistance, corporate officers who remit part of their personal compensation and from major sub-contractors who finance a large part of Moog's inventory.

Four products to sell

Moog Valve says it has four products to sell: (1) electro-hydraulic actuator valves, which are off-the-shelf items; (2) servo-actuator packages, which are custom-made; (3) electro-hydraulic servo systems, which are also designed to customer specifications; and (4) a dual-input servo valve, which accepts a mechanical displacement signal and an electrical signal.

VALVE ACTUATOR package is made for an ICBM sustainer.

Output flow rate of this last valve is proportional to the algebraic sum of the two inputs. This characteristic makes the valve valuable as a purely mechanical-hydraulic surface control valve, or as a mechanical-hydraulic sur-

ALLISON POWERS

TAC's most versatile bomber

THE DOUGLAS B-66 DESTROYER

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Two Allison J71 Turbo-Jets, each producing more than 10,000 pounds' thrust, give this bomber speeds of more than 600 mph with fighter response at maximum altitude. Allison engines are designed and built by America's pioneer producer of turbine aircraft engines.

ALLISON DIVISION OF GENERAL MOTORS—Indianapolis, Indiana

ALLISON *Prop-Jets and Turbo-Jets*

GM AIRCRAFT POWER

face control valve with incremental surface control from an electro-hydraulic input for stability augmentation, or as a purely electrical surface control valve.

Moog dual-input valves are being used on Convair's F-102 interceptor-fighter. The company's most recent valve order is from Martin (Denver) for 112 booster actuators for the Titan missile program.

Bill Moog believes that the aircraft and missile market for his valves will continue expanding. Still, the defense market for speciality items is necessarily limited. For this reason, the company has entered the commercial field and has already sold some of its products to several machine-tool manufacturers. A firm of management consultants have also been hired to find out where else Moog's products can fit into industry.

WILLIAM C. MOOG, JR., founder and president of Moog Valve, started company with $3,000.

Because of the company's spectacular success, it has been approached many times for either direct sale of its stock or for a merger. In reply, Bill Moog, speaking for the owners, says:

"Serious thought has often been given to sale. To date, we have resisted all overtures. We are young and proud of our success and we are anxious to see to it that our company continues to grow."

Westinghouse announces jet engine plans

Westinghouse Gas Turbine Division has taken the lid off its J54, 6,000-lb.-thrust jet engine and revealed that production will begin on the J34-WE-46 engine for the North American T2J trainer in the summer of 1958.

Company officials denied that Westinghouse intended to get out of the jet engine business. Current activities include J34 production, overhaul of the J46 and producing spare parts for the J34 and J46.

Motor - Gear - Trains

3:1 to 150,000:1 Ratio Range • Up to 18 Foot Pounds Torque

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- Designed to meet MIL-E-5272A.
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MOTOR GEAR TRAIN													
Gear Ratio	No-Load Speed	Nominal Voltage D.C.	Voltage Range D.C.	No-Load Current	Normal Speed	Normal Load OZ.IN.	Normal Current	Operating Temp. Range	Size	Overall Length Inches-Max.	Motor Type	Mounting	Oster Type
5.68:1	1800	28	24-32	0.4	1800	5.0	1.0	−55° To +85°C	13	3.777	P.M. GOVERNOR	FACE	13R-9102-00
17.9:1	600	28	24-32	0.4	600	12.0	1.0	−55° To +85°C	13	3.930	P.M. GOVERNOR	FACE	13R-9102-06
32.3:1	300	28	24-32	0.4	300	12.0	1.0	−55° To +85°C	13	3.935	P.M. GOVERNOR	FACE	13R-9102-02
67:1	150	28	24-32	0.4	150	12.0	0.6	−55° To +85°C	13	4.092	P.M. GOVERNOR	FACE	13R-9102-05
85:1	150	27.5	—	.25	130	50.0	0.7	−55° To +85°C	13	4.095	P.M.	FACE	13R-9101-11
109:1	100	28	24-32	0.4	100	32	0.6	−55° To +85°C	13	4.094	P.M. GOVERNOR	SYNCHRO	13R-9102-12
109:1	100	27.5	—	0.4	175	30	0.5	−55° To +100°C	13	2.843	P.M.	FLANGE	13R-9104-01
125:1	75-90	28	—	.25	70-85	20	0.3	−55° To +71°C	13	3.920	P.M.	FACE	13R-9101-13
157:1	60	28	24-32	0.4	60	12.0	0.6	−55° To +85°C	13	4.095	P.M. GOVERNOR	FACE	13R-9102-03
295:1	40	35	—	.25	40	160	0.6	−55° To +71°C	13	4.038	P.M.	FACE	13R-9103-01
333:1	30	28	24-32	0.4	30	12.0	0.6	−55° To +85°C	13	4.317	P.M. GOVERNOR	FACE	13R-9102-04
410:1	15	27	25-29	0.3	15	8.0	0.3	−55° To +85°C	13	4.400	P.M. GOVERNOR	FACE	13R-9102-11
1043.8:1	5-10	27	24-30	0.15	7	30	0.2	−55° To +71°C	13	4.450	P.M. BRAKE	FACE	13R-9105-01
1044:1	5-10	27	24-30	0.15	7	30	0.2	−55° To +71°C	13	3.910	P.M.	FACE	13R-9101-12
2214:1	3-4	6	—	1.2	3.4	30	1.2	−55° To +71°C	13	4.454	P.M.	FACE	13R-9101-04
3241:1	5.5	35	—	.35	5.5	10	0.4	−55° To +71°C	13	4.454	P.M.	FACE	13R-9101-03
5833:1	1.3	30	—	.13	1.3	30	0.15	−55° To +71°C	13	4.816	P.M.	FACE	13R-9101-10
21,787:1	2-3	120	—	.25	2-3	12	0.25	−55° To +71°C	13	3.475	P.M.	FLANGE	13R-9101-16
322:1	80	110	—	0.2	30	240	0.3	−55° To +71°C	15	3.815	SPLIT SERIES	FLANGE	15R-9201-01
407:1	22	27	—	0.2	20	8	0.2	−20° To +50°C	15	3.989	SPLIT SERIES	SYNCHRO	15R-9201-03
433:1	30	26	—	0.6	25	200	1.2	−50° To +80°C	15	3.110	SHUNT	FACE	15R-9201-02
955:1	33	27	—	0.6	12-18	420	1.0	−55° To +50° C	15	4.419	SPLIT SERIES	FLANGE	15R-9201-00
28:1	240	27.5	24-29	0.05	240	40	1.3	−18° To +71°C	17	5.315	SHUNT GOVERNOR	SYNCHRO	17R-9251-01
4.28:1	1800	28	—	0.6	1800	12	1.85	−30° To +55°C	24	4.840	SHUNT GOVERNOR	FACE	24R-9451-01

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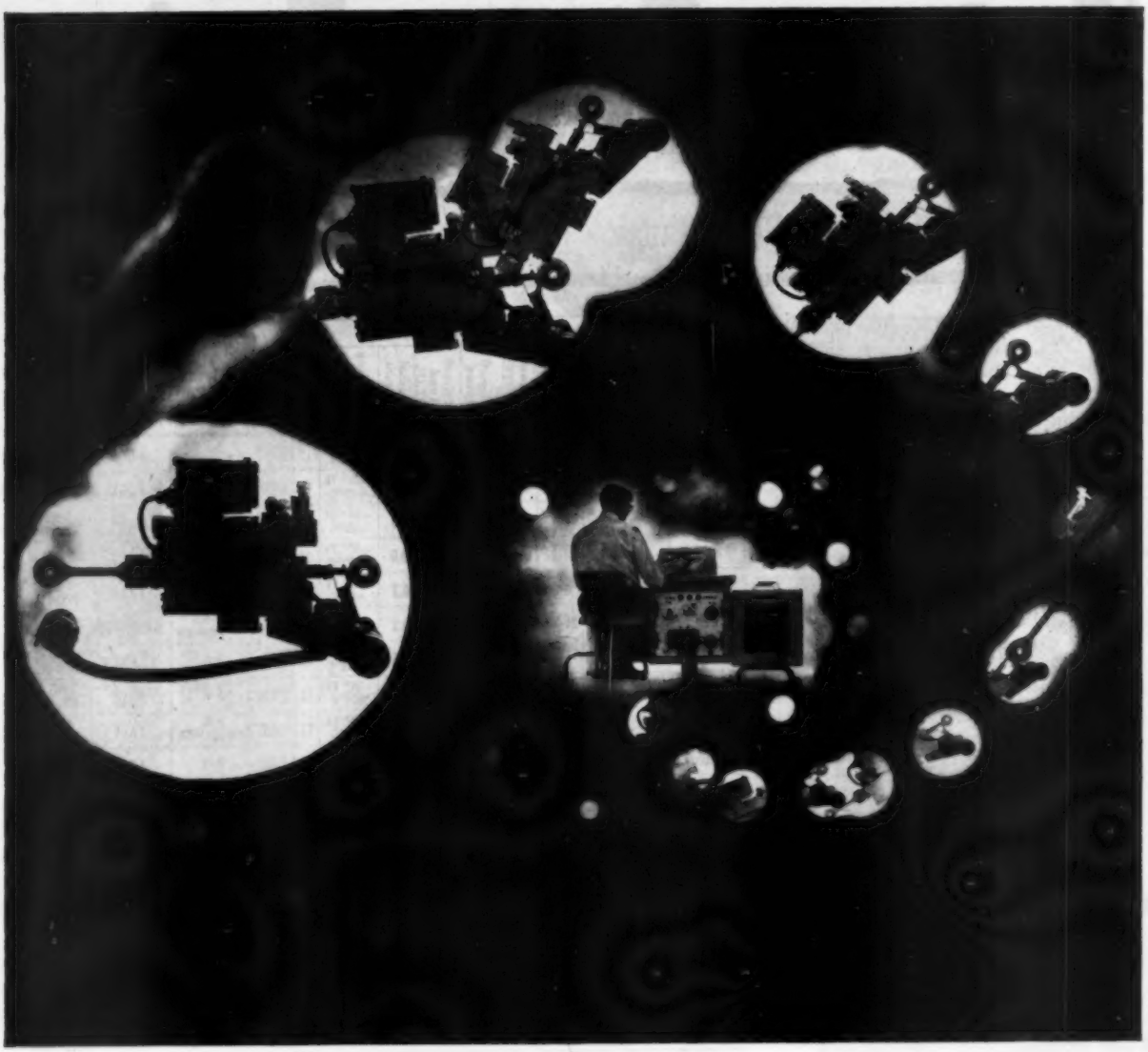

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And nowhere is this challenge being met more energetically than in the development and production of automatic control systems at AUTONETICS. For instance, *Numill*—a new automatic machine-tool system invented by AUTONETICS—often turns the engineer's rough sketch and mathematical notations into prototype parts more rapidly than he could reach the blueprint stage with previous methods.

Standardized "postage-stamp" circuits allow engineers to mockup even highly advanced designs almost as simply as they would plug in an electric shaver. And AUTONETICS' data processing equipment can simulate a wide range of operational missions, as well as solve the most involved mathematical problems in minutes instead of days.

AUTONETICS' ability to save time and money between concept and product delivery is reflected in every area of its electro-mechanical technology: flight controls, inertial navigation, armament controls, computers, and other complete systems for the military and industry.

For detailed information, or for employment in this dynamic field—write: AUTONETICS, Dept A-73, 9150 E. Imperial Highway, Downey, California.

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A DIVISION OF NORTH AMERICAN AVIATION, INC.

AUTOMATIC CONTROLS MAN HAS NEVER BUILT BEFORE

How Chrysler tackles thermal 'barrier' problems

THE BEHAVIOR of structural materials under thermal shock conditions, such as would be experienced by aircraft or missiles during atmospheric reentry, are being intensively studied by the Chrysler Corp., builders of army's Redstone surface-to-surface ballistics missile. Special test equipment was devised for such work by the company's missile operations department in Detroit.

The nose-cone furnace is one means the company is using to simulate the temperature and structural loads that a high-speed operational missile has to resist. This facility is a short-time heater that uses tungsten filament, quartz envelope lamps as a radiant-heat source for the test specimens. Maximum filament temperature is 5,600°F, which is high enough to melt steel.

The structure undergoing test is first loaded by hydraulic cylinders, which are intended to duplicate the stress distributions a missile will meet in flight. The loads being experienced by the test structure are then measured by load cells whose signals are used for recording purposes or for test monitoring.

Before the nose-cone furnace can be used, information is needed about the short-time high-temperature resistance of materials.

For this data, Chrysler engineers devised two machines one of which they call their "High-Speed Dead Weight Stress-Rupture Tester." This machine is designed to apply a dead-weight load to a heated specimen for a measured period of time in order to determine the life of the material under constant stress conditions.

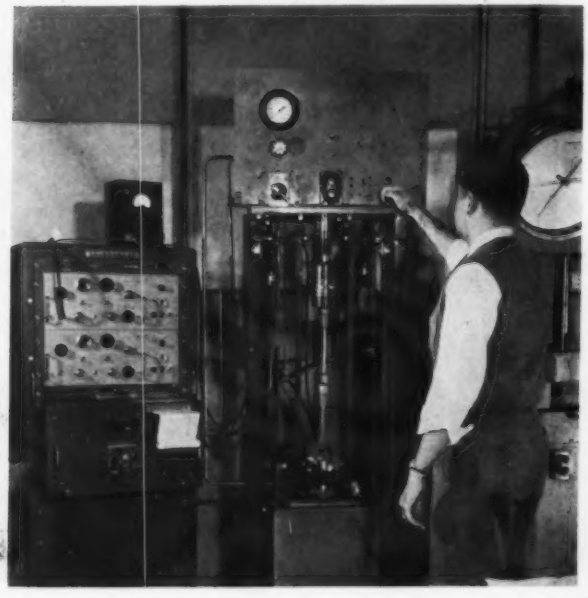
A special power supply was devised for this machine, which can raise the temperature to 2,000°F in as little as five seconds, and hold it within 5° for the duration of the test.

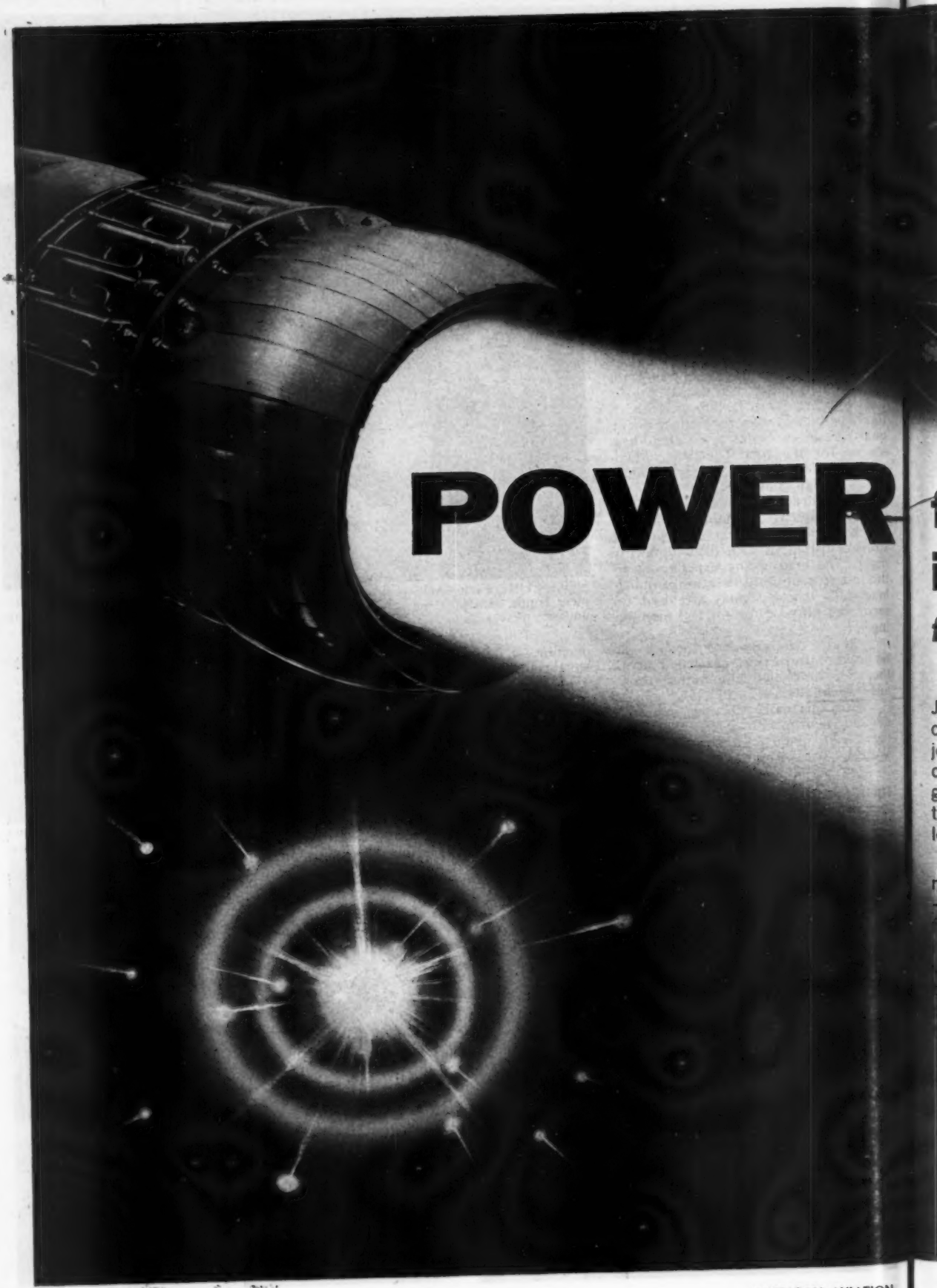
The second machine designed by Chrysler for high-temperature testing is called the "Inverted Tensile Testing Machine." This device conducts standard tensile strength tests on materials at either very high or very low tem-

NOSE-CONE FURNACE is heated by radiant energy from hundreds of tungsten filament lamps. Heater is the frustum of a cone which measures four feet along its axis and six feet at its base.

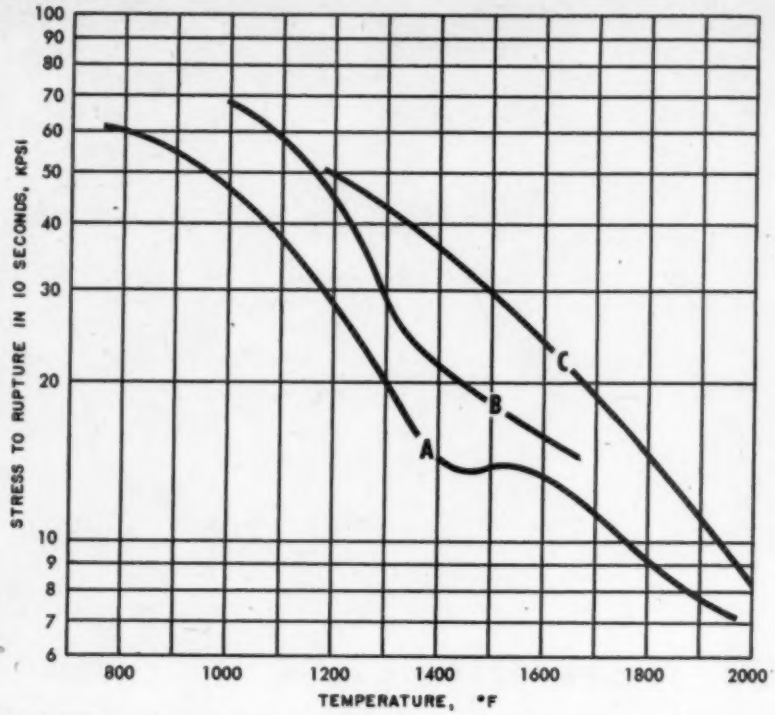
HIGH-SPEED dead-weight stress-rupture tester can bring specimen material to 2,000°F in five seconds. It determines life of material under constant stress conditions.

INVERTED tensile testing machine features an insulated bucket (container at base of machine) filled with liquid nitrogen into which specimen is bathed for low-temperature tensile testing.




POWER


for new aircraft
in whatever form it takes—
from facilities keyed to the future
An important factor in the success of the J-57 turbojet, which has powered more aircraft at supersonic speeds than any other jet turbine in production, is the excellence of Pratt & Whitney Aircraft's research, engineering, and production facilities in thirteen towns in Connecticut, and in five locations in other states.
These facilities—keyed to the requirements of future power plant developments—are the homes of projects which can influence the whole course of aviation. They include the powerful J-75 turbojet entering volume production this summer . . . a number of advanced and still classified turbine projects . . . and entirely new engines of the future.
Before long these facilities will be supplemented by the test and development center near West Palm Beach, Florida, now being built on a 7,000-acre tract. And Pratt & Whitney Aircraft will develop nuclear power plants in the new multi-million dollar Air Force facility which is nearing completion at Middletown, Connecticut.
Within all these advanced facilities, nearly every branch of theoretical and applied science contributes to progress in aircraft propulsion. Whatever form the future takes . . . in new principles of propulsion, new materials, or new fuels . . . Pratt & Whitney Aircraft is prepared to offer continued advancement in power plant design and production.
Pratt & Whitney Aircraft
Division of United Aircraft Corporation, East Hartford, Connecticut
CONNECTICUT OPERATIONS—East Hartford
Major branch plants—Meriden, North Haven, Southington
FLORIDA OPERATIONS—West Palm Beach



TEN-SECOND stress-temperature rupture curves for three groupings of steel. A: Typical of the low-alloy high-strength steels. B: Typical of medium-alloy steels. C: Typical of austenitic stainless steels.

peratures. High temperatures are obtained by the methods used in the previous machine.

For low-temperature testing, an insulated bucket is filled with liquid nitrogen or other low-temperature fluids. The bucket is then raised physically in order to immerse the material specimen. After a short soak time to gain temperature equilibrium in the specimen, the standard tensile test is conducted.

As a result of these tests, curves were derived which show the short-time stress capabilities of typical groups of steels. For a 10-second loading to rupture at steady temperature, the austenitic stainless steels came out best. Next came the medium-alloy steels and last were the low-alloy high-strength steels.

Helio discloses details of Strato-Courier

Helio Aircraft Corp. has announced details of its Strato-Courier, a high-altitude photographic design powered by a 340-hp Lycoming engine and said to operate at altitudes above 30,000 ft. at full payload.

The company said the aircraft has a sea-level rate of climb of 2,000 fpm, will attain 30,200 ft. in 50 min. with full gross takeoff weight of 3,200 lbs. and carries a useful load of 1,420 lbs.

Maximum speed of the new model is placed at 194 mph, cruise speed at 182. Design retains non-stalling, slow-speed characteristics of the standard Courier, permitting flight at 30 mph under full control.

THE CURTAIN OF FIRE Air protection for whole cities and strategic areas is no longer in the "talking" stage. It is now being installed—a combination of the deadly fire of NIKE anti-aircraft weapon batteries and the U.S. Army Signal Corps' new Martin MISSILE MASTER. As the country's first electronic system designed to provide an integrated screen of radar surveillance, target detection and fire coordination, MISSILE MASTER makes possible peak effectiveness of anti-aircraft missile battery operation. A measure of the critical importance of MISSILE MASTER is the fact that the system already has been designated for a number of our most vital civilian and military areas. It is one of the most significant defense developments of our time.

MARTIN

BALTIMORE·DENVER·ORLANDO

Telemetry: vital ingredient for missile R & D, experts agree

By Henry P. Steier

Emergence of the telemetry industry as a critical ingredient of missile R&D was hailed by a missile expert who spoke at the 1957 National Telemetering Conference in El Paso, Tex.

Telemetry's present importance, limitations and future needs were stressed by featured speakers at the conference, Dr. Ragnar Rollefson, chief scientist of U. S. Army, and Dr. E. H. Krause, vice president, Aeronutronic Systems, Inc., Ford Motor Co. subsidiary.

Rollefson said telemetry "as seen from the Pentagon point of view" is something of which we should not be too proud in view of our accomplishments to date.

All the Pentagon hears, Rollefson said, is "holds, holds, holds" because of instrumentation failure, and these are very costly. At the same time, he said, this same reliability factor is mounting in importance when missiles are considered for operational use.

A reliability factor of 99% means little under such circumstances, since attrition rate planning now requires denial of airspace of every aircraft and none must slip through.

Tomorrow's atomic warfare and reliance on the ballistic missile art offers exacting new work in which data must be sent back from the "thermosphere" by telemetry.

The technology of telemetry will have a much wider scope than its present use indicates, Rollefson declared. New equipment is needed for determining conditions in missile target areas that will affect trajectories.

Smaller and lighter missiles will be needed to meet future combat requirements. Among these requirements is dispersal of ground troops which will be reorganized as smaller units.

These will need fire power, and communication and telemetry may be practical means of making the weapons useful in combat, both for control and information feedback on results, Rollefson added.

He pointed out, however, that telemetry has made very great contributions thus far to national defense and in R&D cost saving for defense.

One missile for test often costs millions of dollars, and any saving in number of missiles needed effect great savings overall. One area where gains can be made is in data reduction after tests.

At this time one to two months is needed between tests for getting and examining these data, with four to five weeks as the irreducible minimum. "We must arrange to have data at the end of the test. In this way development time can be cut in half," Rollefson said.

To the need for more rapid acquisition and processing of data, Rollefson added the need for further miniaturization of telemetry gear that will be needed in future missiles designed to carry smaller, lighter warheads and travel faster and more accurately.

Dr. Krause criticized the general press for "dusting off very quickly" announcements on latest missile firings "with the simple statement that information from within the missile was radioed back to the ground."

He suggested "this might be because telemetry is passing through the adolescent phase" despite the fact that it has been around for about 15 years.

Today, although we have lots of telemetry equipment on the shelf and in production, we are faced with outstanding problems in reliability, data handling, long distance links and peculiar propagation phenomena.

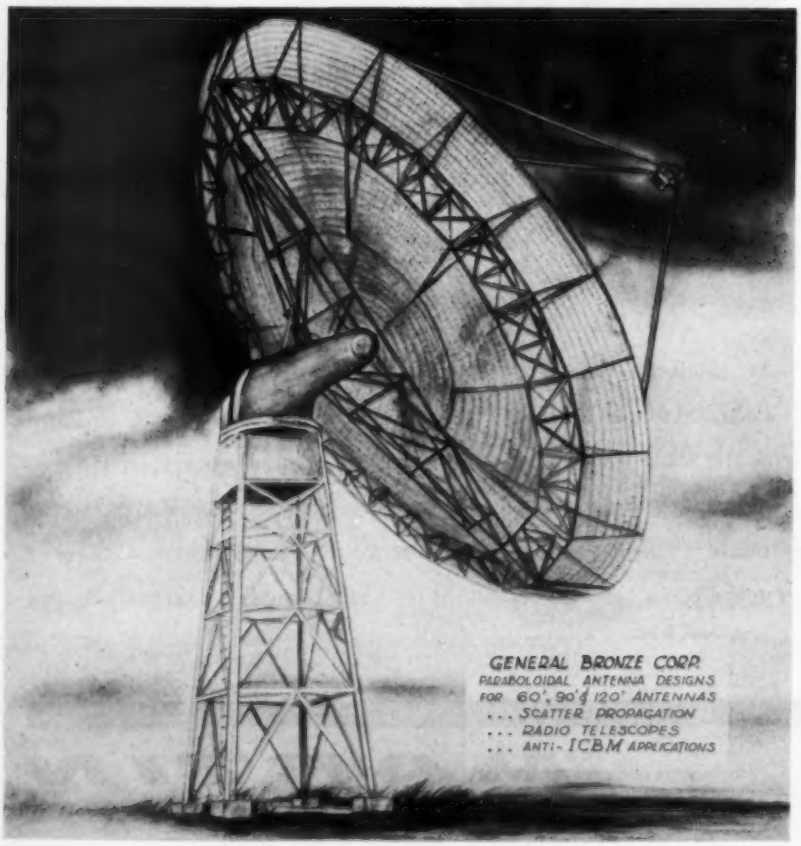
Fruitful fields for further improvement are: improved safety devices to prevent off-range flight accidents: space flight telemetry; careful choice of frequencies now to prevent handicaps later; development of adequate digital sensors for time saving and greater accuracy, and techniques for overcoming radio transmission problems in Mach 13-15 vehicles.

Energy produced by these high speed vehicles ionizes the atmosphere around them to produce high electron densities close to that of metals.

The existence of such a high density sheath around these vehicles means a complete blockage of all radiometric transmissions.

Radar antenna for anti-ICBM systems

NEW PARABOLOID ANTENNA unveiled by General Bronze Corp. of Garden City, N. Y. is designed for scatter propagation, radio telescope and special radar use such as in anti-ICBM defense systems. Company has developed a standard design for 60, 90 and 120-foot parabolas.



New from Clary!

"Guided" valves for guided missiles!

high-pressure line valves with 5 choices of actuation!

Now you can "guide" the operation of these valves with 5 different actuation systems–solenoid, pneumatic-hydraulic, manual, explosive or shuttle! A truly complete line of high-pressure line valves.

Here at Clary, our years of experience in manufacturing guided missile components – gyroscopes, servo-actuators, propellant valves, telemetering transducers – now enable us to bring you these high-pressure line valves built with the same precision. Our extensive inspection and quality control guarantee the maximum reliability required of missile components.

When **precision, reliability** and **versatility** are factors in your plans, please call on Clary for complete services, including:

DESIGNING AND TESTING to established specifications and envelope drawings.

PRODUCTION-ENGINEERING of components and complete assemblies covered by your prototype, sketches or drawings.

MANUFACTURING of precision components to established drawings and specifications.

(Shown from top to bottom)

SOLENOID
Hermetically sealed coil
18-30 volts D.C.
Low current consumption

PNEUMATIC-HYDRAULIC
3000 psi operating pressure
Zero leakage
"O" ring seals

MANUAL
Miniaturized toggle action
On-off control
Fixed flow

EXPLOSIVE
Positive on-off action
Trigger release
Protected seat

SHUTTLE
Repetitive reliability
Ideal for final check-out system
Non-interflow

Clary

AUTOMATIC CONTROLS DIVISION

Clary Corporation, Dept. AA67, San Gabriel, California

MANUFACTURER OF BUSINESS MACHINES, ELECTRONIC DATA-HANDLING EQUIPMENT, AIRCRAFT AND MISSILE COMPONENTS

NOW IN PRODUCTION...

VISCOUNT 810·840

BIGGER, FASTER MODEL OF WORLD'S MOST POPULAR AIRLINER

Greater Capacity: Designed for higher operating weights, new Viscount is 9′ 3″ longer. Result: increased seating capacity. First class: 52. Tourist: up to 70.

Faster: New Viscount will have an initial cruising speed of 365 mph. By 1959, more powerful Rolls-Royce engines will be available—increasing speed to *400* mph.

Lower Costs: Same low operating cost-per-mile as present Viscount 700 series, but with *lower cost-per-seat-mile* due to greater capacity.

New Flexibility: New Viscount can carry full payload up to ranges of 1200 miles (1400 miles with "slipper" tanks).

Proved Performance: The Viscount is the *most proved* Jet-prop. Viscounts will have chalked up over 1,000,000 hours by the time the first 810's go into regular service. *There's no substitute for experience!*

Orders from over *30* of the world's leading airlines prove that *"wherever the Viscount flies...traffic figures rise."*

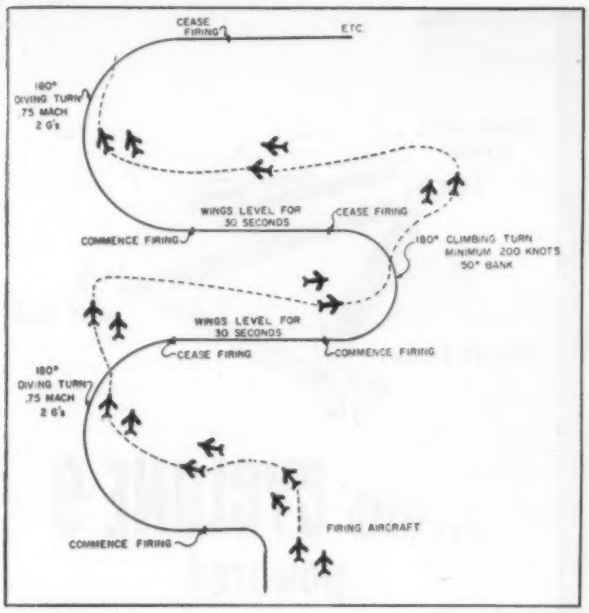
These Airlines Have Ordered Viscount 810/840's: Continental Air Lines, South African Airways, Lufthansa, Pakistan Int'l. Air Lines, Compania Cubana de Aviacion, V.A.S.P. (Brazil), Eagle Aviation Ltd.

jet-prop VICKERS VISCOUNT

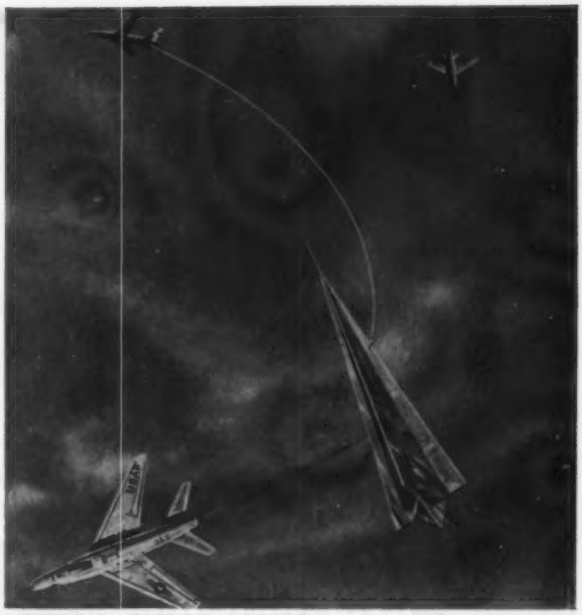
POWERED BY FOUR ROLLS-ROYCE DART ENGINES

U.S. Representative: Christopher Clarkson
10 Rockefeller Plaza, New York 20, N. Y.

VICKERS-ARMSTRONGS (AIRCRAFT) LTD., WEYBRIDGE, ENGLAND • MEMBER COMPANY OF THE VICKERS GROUP



A TYPICAL FLIGHT PATTERN for gunnery training with a Universal dart-type target.



VERTICAL FIGURE EIGHTS or cloverleaf patterns performed by tow plane are followed by target.

Dart-type target passes Air Force tests

The Universal Target Co., Los Angeles, Calif., has announced that its new dart-type target has successfully passed Air Force evaluation tests at Nellis AFB, Las Vegas, Nev.

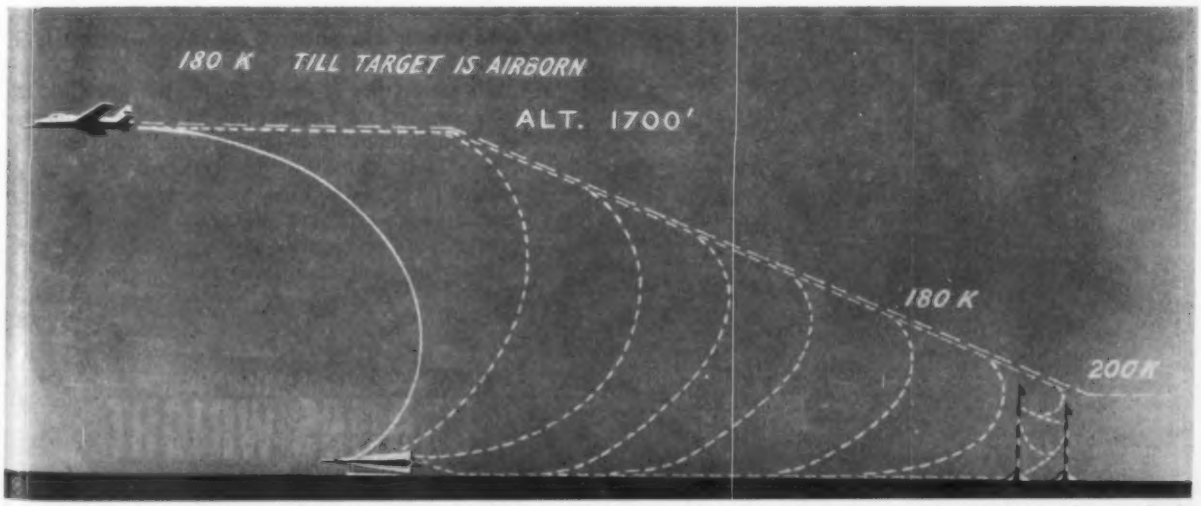
The targets are said to have a combination of optical and radar visibility, maneuverability at high speeds, high gunfire absorption, and the ability to be returned, scored, patched, and reused. They are designed to be launched in-flight and towed at sub- and super-sonic speeds.

Available in two sizes, the K-11 (6 feet high and 16 feet long), and the K-12 (8 feet high and 20 feet long), the targets are constructed around an aluminum extrusion which runs from the tail to the points of the wings. Wings are of honeycomb and aluminum sandwich construction, may be patched by use of aluminum contact tape, or easily changed if major damage is sustained. The nose section is composed of four easily replaceable lightweight angles designed to absorb the landing shock.

The targets will be sold as kits composed of one complete target, four extra wings, a reflector and nine nose sections at a cost of $930 per kit. Universal estimates 10 flights per kit are possible, so that cost of using the targets is slightly less than $100 per flight.

The target is towed with 2,000 feet of 7/16-in. twisted nylon rope. A new ¼-in. braided nylon rope is under development. Tests have shown that the new configuration reduces drag and permits tows at considerably higher speeds. With the additions of a nylon rope leader, safe in-flight pickups have been made at speeds between 180 and 220 knots with no material effect on rope life.

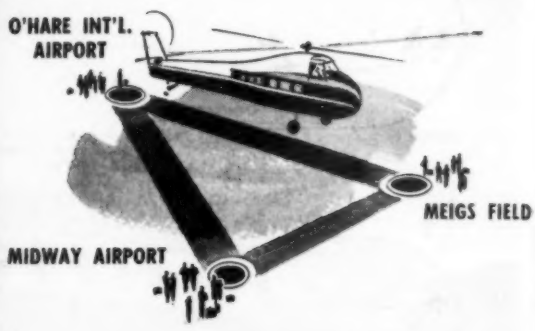
Universal has been licensed to manufacture two types of tow hooks developed by North American Aviation, one operated electrically, the other hydraulically. Studies are being made to adapt these hooks to the aircraft of other manufacturers. As all the hooks are jettisonable, aircraft used as tow ships can be converted for combat service in seconds.



IN-FLIGHT PICKUP PATTERN for dart target. Loop for hook is mounted 12 feet above the ground on light wooden standards. When pickup is made, 2,000 feet of line between pickup point and target forms a catenary, lifting it slowly from the cradle.

CHICAGO HELICOPTER AIRWAYS

reduces travel time 80% over Chicago's "Triangle of Terminals"



...with CYCLONE 9 powered SIKORSKY S-58 helicopters

Chicago's airports—Midway and O'Hare—are approximately 16 air miles apart. To cover the distance between them by cab takes an hour or more in average traffic. But to travel these miles by Chicago Helicopter Airways takes just 12 minutes—and costs less. Air travelers have been taking full advantage of this fast, dependable service, and of CHA's other suburban passenger and mail schedules, since their inception.

On April 1 this year, the airline expanded its service to include Meigs Field—speeding connections over the triangle of airport and midtown terminals. For this schedule—a long-sought goal—Chicago Helicopter Airways selected big Sikorsky S-58 helicopters, powered by Curtiss-Wright Cyclone 9 engines.

In other cities of the U. S. and the world, as in Chicago, Cyclone 9 power has solved the problems of metropolitan inter-airport and "downtown" travel. The Cyclone 9 is a powerful answer to many special problems and use-requirements in modern aircraft, both civil and military—including transports, patrol and rescue aircraft, sub-hunters and trainers, as well as advanced design helicopters.

WRIGHT AERONAUTICAL DIVISION
CURTISS-WRIGHT
CORPORATION • WOOD-RIDGE, N. J.

World's Finest Aircraft Engines

Light twins win favor of business pilots

By George R. Shaw, Jr.

There is a definite trend toward "light twins" in business flying and much eidence of increased interest in instrumentation and electronic aids to navigation. Accessory and component manufacturers, sensing this trend, are adapting their products to the expanding field of corporate flying.

In short, full-panel installations once found only in big airliners are showing up in light planes.

These trends were apparent at the eighth annual maintenance and operations meeting at Reading, (Pa.) Airport sponsored by the Reading Aviation Service. This year 31 manufacturers had displays set up in the RAS maintenance hangar. The emphasis everywhere seemed to be on lighter, less expensive aircraft equipment, obviously beamed at this fast growing, lucrative market.

The Reading show was originally intended as a vehicle for the exchange of ideas and developments in aircraft maintenance and safety, but was expanded to include displays of lightplane equipment, bringing the manufacturer and the user together. Plans are being considered to enlarge the program to two or three days in 1958.

More than 300 planes flew in to Reading for the one-day meet, ranging in size from DC-3s and Venturas to Piper Cubs, but there were more of the twin-engine, four-place to seven-place types than in previous years.

Operators spoke enthusiastically of the increased utility of the speedy twins. Many feel that this is the executive plane most companies have been waiting for. Indeed, there are already many corporation 'fleets' made up of planes such as the Aero Commander, Piper Apache, Twin-Bonanza and Cessna—as well as the old stand-bys, DC-3s, Venturas and Lodestars.

A. M. "Sime" Bertolet, president of Reading Aviation Service, pointed out that he prefers to call it a meeting rather than a show, as the term "air show" usually presupposes aerobatics and daredeviltry.

An unusual feature of the fly-in was the absence of aircraft milling overhead. R. H. Breithaupt, RAS vp-sales, said the planes just seemed to appear on the runway, and taxi up to the ramp. It looked deceptively simple, but in fact a complete plan of the landing and parking operation was mailed to pilots and operators before the meet; so when they approached the Reading Airport the pilots were already "briefed" on the approach and landing procedures.

A. M. "SIME" BERTOLET, president of Reading Aviation Service, explains radar installation in RAS' Aero Commander to television star Herb Shriner and George Shaw, AMERICAN AVIATION staff writer.

Manufacturers' exhibits included everything from rato bottle to the latest in lightweight radios.

Of all the exhibits, the airplanes parked on the ramp probably attracted as much attention as anything else. They ranged from a Mooney Mite to a plush Convair. A few steps separated a 1927 OX5 powered biplane and a 1957 Royal Gull. Venturas and Lodestars dwarfed the nearby Navions and Bonanzas. There was an airplane to suit every corporate need and pocketbook.

The speeches, on training standards, manualized maintenance procedures, and ground and flying safety, were geared to the specific needs of corporate flying. The speakers were selected for their prominence in the field.

Joseph Chase, Flight Safety Foundation, used "Murphy's Law" as the theme of a speech on maintenance: "If an aircraft part can be installed incorrectly, someone will install it that way." He cited manualized maintenance as the answer.

National Dairies' DC-3 was voted best all-round airplane at the show. It will be flagship of the business fleet for the coming year.

Pilots agree: standards of proficiency needed

Need for an established training standard to assure proficiency of business aircraft crews was voiced by pilots attending the third annual Business Aircraft Seminar of the Flight Safety Foundation in New York.

As a step in filling this need, a representative group of corporation pilots invited the foundation to prepare a training guide to assure the attainment

SOME of the more than 300 aircraft that flew to Reading, Pa., for the Maintenance and Operations Meeting June 1.

New Royal Gull for executive market

TRECKER AIRCRAFT CORP.'s Model P136 Royal Gull, five-place amphibian, aimed at lucrative executive market, is offered with either 270 or 340 hp Lycoming engines. Basic airframe is manufactured by Italy's Piaggio Co. and shipped to U.S. where Trecker installs engines, propellers, instruments, radio and interior furnishings.

and maintenance of high standards of safety and efficiency in business aircraft operations.

A nine-man committee was formed and it will meet within the next few months to finalize the guide, which will be offered to all operators of business aircraft.

The committee framed a resolution that calls for a periodic flight check to determine a pilot's level of proficiency and the effectiveness of the training program. It also calls for verification through flight checks each six months of a piliot's instrument proficiency to meet requirements of the CAA certificate held.

Other highlights of the seminar:

Commendations from Air Traffic Control personnel for the business pilots' adherence to good operating practices in the New York high density area.

Extensive discussions regarding emergency procedures in event of radio failure, use of reflective paint to facilitate identification and preferential routings to the west coast.

Hamilton builds hangar, offices at Tucson airport

Gordon B. Hamilton Co., Tucson, Ariz., has completed a 30,000-sq.ft. combined hangar and business office building on a 15-acre site bordering Tucson Municipal Airport.

Licensed by Lockheed to remanufacture executive Lodestars from Hudson bombers, company currently is engaged in building a Learstar hull for PacAero as well as an executive conversion of its own design for the Baker Co., platinum fabricators. With more executive ships on the boards, Hamilton has purchased 10 PV-2s from Navy surplus at Litchfield Park, Ariz.

Other projects under way at the new facility include a survey of several Grumman SA-16 amphibians in connection with an IRAN program for the Brazilian and Chilean governments, and the preparation of Douglas B-26s for ferry to Fairchild's St. Augustine, Fla., location where they will be overhauled for the Brazilian Air Force.

The Hamilton company has expanded its work force from 30 to 140 in the last eight months. It grossed $550,000 in 1956, anticipates a gross of $1 million this year. Company officers are Gordon B. Hamilton, president, and Courtney L. Varner, vice-president and treasurer. Firm was founded in 1947.

To Keep The Starfighter's Radar Fire-Control "On Target"

RCA and LOCKHEED choose ROBINSON

all-metal MET·L·FLEX mountings

Model 1660

Farther than man can see, faster than man can think, the Starfighter's Radar Fire-Control detects and tracks the fast moving and elusive target.

This more than human RCA detecting device, in the ship's nose, is 150 pounds of high performance and reliable electronic equipment. This equipment is completely supported in a minimum of space by the twin mountings which together *weigh less than 5 pounds.*

Robinson engineered these mountings to provide maximum protection against take-off shocks, abrupt change of path, 4G sustained acceleration and temperature extremes.

Met-L-Flex fabricated wire cushions feature inherent damping and require no auxiliary friction devices. These mounting assemblies provide quick release attachment to the airframe.

The twin mountings shown are simple, light weight, rugged and possess **INHERENT DAMPING.**

There are **TWENTY-SIX** other vital electronic devices protected by Robinson engineered mounting systems throughout the Lockheed F-104 Starfighter — including the pilot's instrument panel.

VIBRATION CONTROL IS RELIABILITY CONTROL

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KEY OPENINGS FOR MECHANICAL AND STRUCTURAL DESIGN ENGINEERS! Aeronautical, Mechanical and Civil Engineers design, develop and test aircraft components from original design stage through flight test.

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FIRST IN AVIATION

AiResearch develops turbofan for ground-cooling cabins of Boeing 707 jet airliners

AIRESEARCH MANUFACTURING DIVISION, The Garrett Corp., has developed a lightweight turbine-driven fan to provide Boeing 707 jet transports with comfortable cabin temperatures during ground operations.

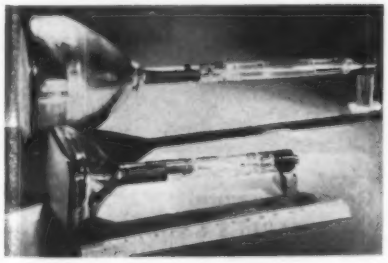
In flight, ram air is channeled through heat exchangers to reduce the high temperature of pressurized air heading into the cabin. However, on the ground ram air is absent and at relatively low airspeeds is insufficient. In these situations, the turbofan, first of its kind in commercial aircraft application, takes over.

The fan has a capacity of 1,000 cu. ft./min. for each 2.65 lbs. of weight. It has a ring circling the tips of fan blades. Mounted on the ring are turbine buckets. Air ducted from a turbo-compressor is forced against the buckets and turns the unit at speeds in excess of 11,000 rpm.

Through this action, the fan draws ambient air through heat exchangers to cool pressurized cabin air being cross-channeled through the same heat exchangers. After performing its cooling task, the air drawn by the turbofan is returned to the atmosphere.

An automatic switch turns on the fan when the plane is on the ground. Another switch, operative in flight, turns it on when the temperature in the cooling units, under certain conditions, gets too high because of lack of ram air.

Circle No. 150 on Reader Service Card.



Wave-modulated oscilloscope

SYLVANIA ELECTRIC PRODUCTS INC. has developed a new short version of the Wamoscope for radar and other display applications. The tube is 17" long and weighs 2½ lbs.

The wave-modulated oscilloscope has 90-degree deflection and operates at 2,000-4,000 mc.

Circle No. 100 on Reader Service Card.

27-channel VHF transmitter

NATIONAL AERONAUTICAL CORP. is producing a compact VHF transmitter with 27-channel capacity. The VTA-3 unit measures 6¼" x 6¼" x 1 9/16".

The transmitter may be used with its own power supply as a separate unit, or attached to the Narco Omnigator VHF/VOR unit.

Circle No. 102 on Reader Service Card.

Panel indicator light

RADAR RELAY, INC., is marketing a twin-lamp panel indicator light that permits instantaneous, accurate comprehension of illuminated word messages without need for interpreting small individual lights.

Units may be used individually or in stacks on aircraft control panels. Designed for maximum daylight visibility.

Circle No. 114 on Reader Service Card.

Wire-holding clamp

A miniature wire-holding clamp manufactured by DAKOTA ENGINEERING INC. is designed to secure wire bundles in aircraft and missiles. Unit is made of Nylon/Zytel.

Clamp withstands impact loads better than 50 Gs and is resistant to fatigue in any position.

Installation involves two quick operations: Placing the wire inside the U-shaped clamp and manually pushing a keeper over the notched edges where it locks with high holding power. Sizes range from 3/16", .001 lb., to 2½", .052 lb.

Circle No. 187 on Reader Service Card.

High-altitude altimeter

HASTINGS-RAYDIST, INC. has introduced an altimeter which it says is accurate in the high-altitude ranges from 75,000 to 225,000 ft.

Altimeter operates on 115 vac, is unaffected by ambient temperature changes, provides continuous direct altitude reading or recording, has rapid response to altitude changes. It holds calibration indefinitely, is unharmed by any sudden exposures to any atmospheric pressures. Utilizes compact tranducer with internal volume less than 1/20 cu. in.

Circle No. 188 on Reader Service Card.

Fuel flow test stand

A portable test stand that checks fuel flow-meter calibration and engine fuel components under conditions closely approximating actual flight conditions is being built by AIRSECO, INC.

The precision flowmeter on the test stand is connected through a hose into the aircraft's fuel boost pump. Testing is done with fuel in the plane. Corrections for specific gravity and temperature are made on the testing unit. Accuracy is within ±1% while checking fuel flow ranging from 140 to 3,000 lbs./hr.

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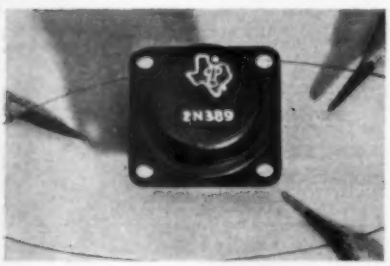
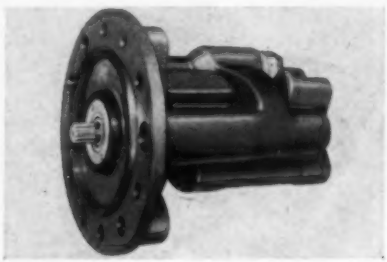


Diffused-junction transistor

TEXAS INSTRUMENTS INC. has introduced the first commercially available gaseous diffused-junction transistor. Highest power silicon transistor in the industry, the unit is rated at 37.5 watts at 25°C and 15 watts at 100°C.

Collector current in the 2N389 is two amperes and saturation resistance is six ohms. In aircraft use, a 60-volt collector-to-emitter rating allows power to be taken directly from the 28-volt supply.

Circle No. 112 on Reader Service Card.

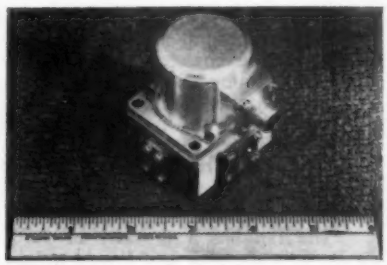


Rotary vane scavenging pump

LEAR-ROMEC DIVISION, LEAR, INC. has introduced a pump with three scavenge inlets that have a common discharge port. Unit can operate at altitudes from sea level to 70,000 ft. and in ambient and fluid temperatures of from —65°F to 350°F.

Each scavenge element has minimum rated capacity of 1.5 gpm with 20 psi absolute discharge pressure. Two elements have 5 psi absolute inlet pressure and third has 1 psi absolute inlet pressure.

Circle No. 107 on Reader Service Card.



Time-dwell servo valve

THE GARRETT CORP. has developed a 1¼-lb. unit designed to convert electronic signals into control forces for guided missiles, drones or aircraft.

Time-dwell servo valve serves as link between missile's electronic computer and control surface actuators regulating the flight path. It converts electrical signals into hydraulic forces.

Hydraulic oil flows can be regulated from 1/10 to 5 gal./min. at pressures from 750 to 4,000 psi.

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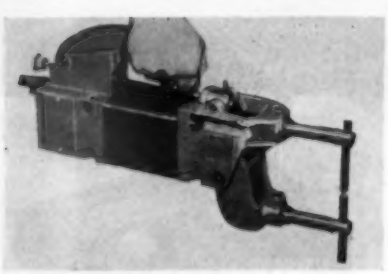
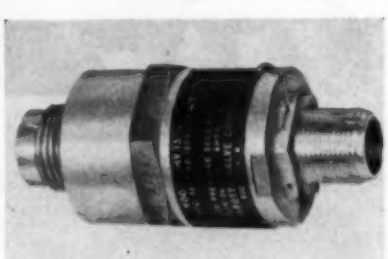


Spot welder

GUTHERY MACHINE TOOL CORP. is marketing a spot welder incorporating many advantages of its Aero spot welders line.

Model P-166A has extremely high welding current for its size. Operated by one hand, unit is easily adjustable, has built in trip-switch. Water or air-cooled, air-hydraulic or air-operated versions available in high production and portable series.

Circle No. 190 on Reader Service Card.



Miniature pilot valve

MAROTTA VALVE CORP. has introduced a three-way, normally open magnetically operated miniature pilot valve weighing 0.375 lbs. and rated for up to 4,500 psi service.

Model MV-137-G has hermetically sealed solenoid operating within 14v to 32v to control flow through orifice diameter of .030". Ambient temperature range of from —100°F to 250°F, fluid temperature from —65°F to 250°F.

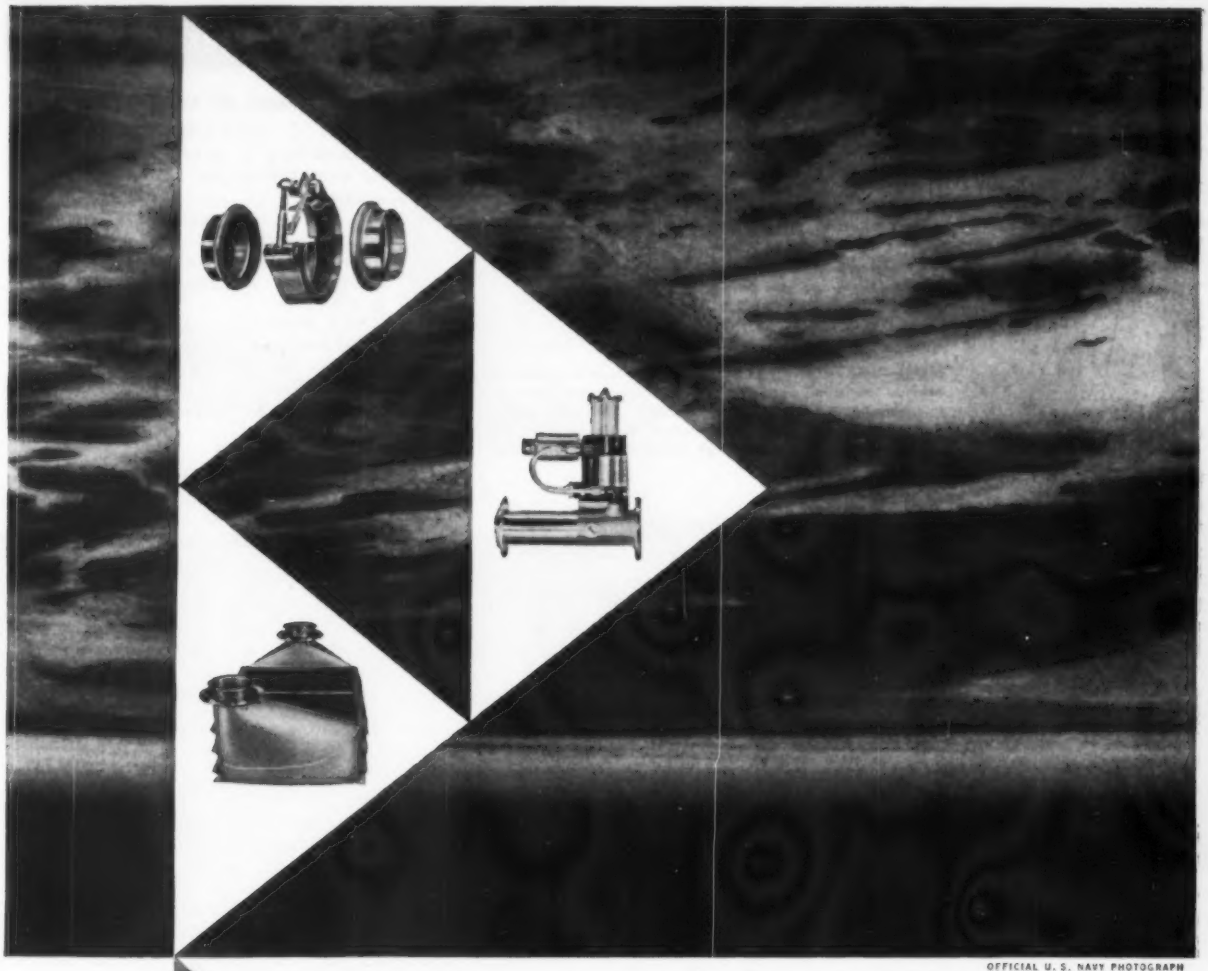
Circle No. 143 on Reader Service Card.

Refractory cement

CHARLES ENGELHARD, INC., has developed a refractory cement which will hold metal to metal, glass or ceramics despite temperatures between—420°F and 1,000°F.

CA-9 is dielectric, highly shock-resistant throughout temperature range, upper limit of which can be extended to 1,500°F by modifying composition. Material remains malleable after drying, is waterproof, nonhydroscopic.

Circle No. 191 on Reader Service Card.



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three Janitrol® answers to exciting new problems!

Janitrol couplings for bleed air ducts provide positive metal-to-metal seal, are easily installed in tight spots, stay pressure-tight after repeated disconnects—and in addition give lowest weight per coupling yet achieved.

Janitrol pneumatic valves and regulators bring new versatility, light weight and dependability to air distribution systems for tank pressurization, canopy seal, and other vital air-powered devices.

Janitrol Platular® heat exchangers combine the efficiency of tubes, the strength of plates, and the simplicity of modular construction. They offer new compactness, high performance, and freedom of design in restricted spaces.

If your company is making major investments in jets and missiles for the future, Janitrol's resources can serve you well. They have carried a broad range of aircraft hardware out of the design stage into proven realities. Your Janitrol representative invites your inquiry . . . Janitrol Aircraft-Automotive Division, Surface Combustion Corporation, Columbus 16, Ohio.

NEW PRODUCTS

High-pressure air compressors

M. C. MANUFACTURING CO. is marketing a series of high-pressure air compressors for use in the aircraft industry.

Basic compressor in the series can be combined with 1,500- or 3,000-psi hydraulic motors with ac or dc electric motors, or mounted directly to an engine pad.

Compressor is 4-stage, piston-type, using frictionless-type bearings, has oil capacity for 100 hrs. operation. Weight is 10.7 lbs.

Circle No. 192 on Reader Service Card.

Miniature relays

Series of miniature aircraft type 4PDT relays featuring sealed coil within hermetically sealed case, inorganic, symplified switch for reliability in dry circuit applications, developed by HART MFG. CO.

Diamond H Series S relays can be stored indefinitely and operated at temperatures from —125° to —65°C. Assembly displaces 1.6 cu. in.

Circle No. 193 on Reader Service Card.

Titanium pressure vessels

TITANIUM FABRICATORS, INC. is marketing spherical, high-strength pressure vessels for aircraft and missile applications. Vessels are formed from titanium alloy and other materials.

Vessels range in size from 12 in. to 25 in. in diameter. They are formed by hot spinning hemispheres then are welded with advanced techniques.

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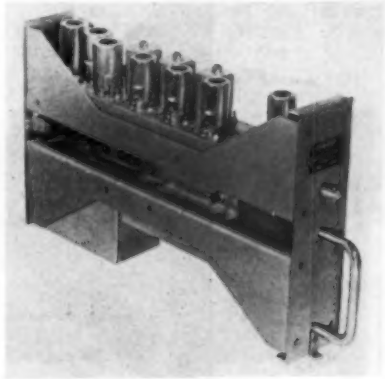


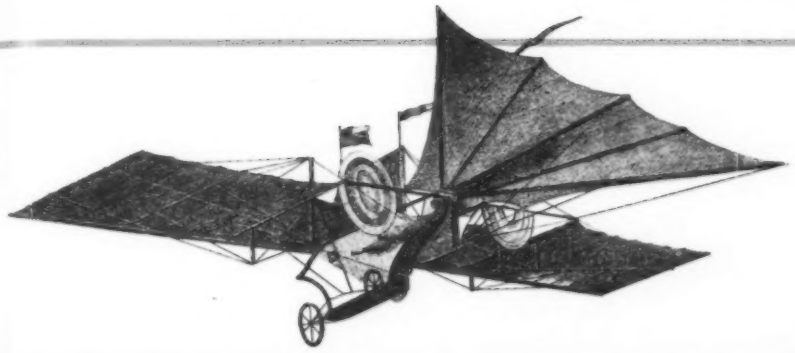
Marker beacon receiver

A lightweight marker beacon receiver without dynamotors, vibrators or relays and using transistors has been announced by DARE, INC. Transistors are used in a multivibrator circuit to eliminate usual power supplies.

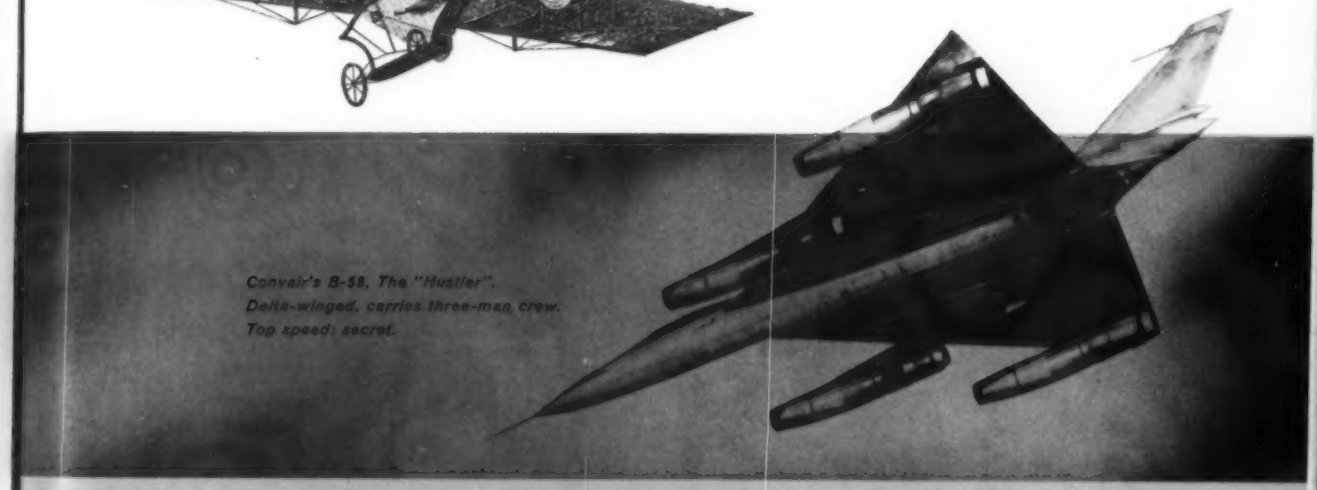
The crystal controlled unit uses 5 electron tubes and 4 transistors in modular construction. The unit weighs 4½ lbs. and fits a short ¼ ATR rack. The 3-light DMB-3 receiver may also be used as a 1-light receiver.

Circle No. 194 on Reader Service Card.

VIVE LA DIFFÉRENCE



Henson's Aerial Steam Carriage. A model was actually built. Top speed :0— it never flew.



Convair's B-58, The "Hustler". Delta-winged, carries three-man crew. Top speed: secret.

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Over three years of successful flight service and millions of feet of installed hose testify to the complete reliability of Fluoroflex-T hose assemblies at temperatures from −100°F to +500°F. Contributing to this remarkable performance, among other things, is the greater flexibility and flex-life of the patented Fluoroflex-T construction. Separate the facts from fable on hose made from Teflon—see the reverse side of this page.

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hose assemblies

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Patented tube compound

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Millions of feet in service

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Patented fireproof construction

Self-supporting pre-formed assemblies

Service-proved constructions to 3000 psi

The greater flex-life of Fluoroflex-T hose assemblies is one of many reasons for their outstanding performance and reliability — *proved in over three years of tough, hard service.*

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Only Fluoroflex-T assemblies provide this safety factor — the minimum insurance which the human lives and costly equipment involved deserve for their protection.

Now, with millions of feet in service, the record speaks for itself. Fluoroflex-T hose assemblies truly insure optimum reliability for aircraft engines, frames and missiles.

VITAL FACTS ABOUT FLUOROFLEX-T

Fluoroflex-T hose is made of DuPont's Teflon® — a *raw material.* The addition of compounding ingredients or the nature of fabricating techniques can vary properties in the end product considerably.

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Since the properties of products from Teflon can be made to vary greatly, the fabricator's integrity and experience remain the user's best assurance of reliability and performance.

In Fluoroflex-T assemblies, it is the unique patented tube and special manufacturing techniques originated by Resistoflex that make the vital difference.

Resistoflex is the only "coupling manufacturer" that has worked with Teflon since its introduction. If you have any questions on the behaviour of hose made from Teflon, you can get the right answer from Resistoflex — conservatively expressed.

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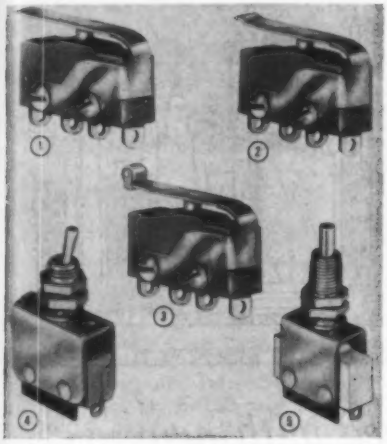
NEW PRODUCTS



Switch actuators

ROBERTSHAW-FULTON CONTROLS CO., is producing five switch actuators for use with its sub-miniature switch. Models include leaf, frame leaf, roller leaf, plunger, toggle.

Actuators designed for 3/4" switch, rated 10 amperes at 125-250 vac, 1/2 hp 125 vac, 10 amperes 28 vdc of double-throw, double circuit design.

Circle No. 195 on Reader Service Card.

Recording oscillograph

Model 561 recording oscillograph manufactured by MIDWESTERN INSTRUMENTS, INC. offers wider range of recording speeds and has added trace identification. It incorporates speed selections from .5 to .80 in. per sec. Accommodates 92 ft. of recording paper. Can be installed inside missile, recovered after flight. Weight, 15½ lbs.

Circle No. 110 on Reader Service Card.

Interference blanker

HOOVER ELECTRONICS CO. has announced a radio interference blanker for reduction of precipitation static. Model 10018 Blanker was developed at the Communications and Navigation Laboratory, Wright Air Development Center.

The unit is available in a ¼ ATR case. It operates by disconnecting the receiver from the antenna during the time of static discharge.

Circle No. 196 on Reader Service Card.

White-light stroboscope

WESTERN GEAR CORP. is manufacturing a miniaturized, portable high-intensity white-light stroboscope.

This is a compact, true-color stroboscope for viewing rotary, reciprocating or repetitive motion.

Specifications: flash duration, 10 microseconds; light output 5 Lumen seconds per flash, repetition rate 0 to 100 pulses per sec.; dimensions 6"x5"-x5¾".

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Here's what British want in air talks with U.S.

Negotiators are expected to try for language concessions that might seriously hurt long-term interests of U.S. airlines

by William V. Henzey

GREAT BRITAIN is expected to ask the United States this week to agree to new international fare and rate control in which suggested rate powers go far beyond what the British now have and exceed in some instances the power delegated to the U.S. Civil Aeronautics Board by Congress.

In addition, the British are expected to ask more restrictive rules affecting an existing practice in which airlines may change aircraft short of the final terminal on a foreign route. Such restrictions could seriously affect future jet transport operations, U.S. representatives feel.

The issues will be raised in London, June 18, when bilateral air agreement talks resume between the U.S. and United Kingdom. Opening talks last February in Bermuda were productive only of the need for the meeting scheduled this week.

Significantly, while bilateral talks between the U.S. and most countries are primarily concerned with new route awards, those with the British center around language concessions which could prove more damaging to U.S. airline interests in the long run, than the many so-called "give-away" route awards to foreign airlines.

Actually, the U.S. went into last February's talks with at least two important route authorizations it wanted from the British for U.S. airlines. The U. K., however, wanted no specific route concessions from the U.S. at the time. But it threw the Bermuda talks into a turmoil with a long-range plan whereby British airlines would get extensive U.S. operating rights. The British did not push the long-range plan in February and are not expected to push it at this week's talks.

British want language changes

Thus, the negotiators enter their talks with U.S. route requests expected to be countered by British requests for language changes in the air agreement between the two nations. There is no known disposition on the part of U.S. negotiators to grant the language concessions, but there is also no way of knowing how much the U.S. is willing to give up to gain what it seeks in the potential bartering session.

One of the major rate changes which the British are expected to push would, for example, give that country the power to regulate rates of U.S. carriers beyond England to other foreign countries. Thus, the London-Cairo portion of a through fare for New York-London-Cairo service would be subject to British approval.

In addition, other foreign governments could be expected to ask similar authority and the already-complicated international fare and rate structure could get lost in an increased maze of governmental red tape, to say nothing of the veto powers which would then be vested in each foreign nation.

The British point, however, is that the U.K. does not have a statutory framework of rate regulation such as exists in the U.S. and its proposal would be tantamount to equalizing relative powers.

Another change which the U.K. seems to desire would give it and the U.S. power to enforce a rate upon carriers, including, of course, U.S. flag airlines. This is significant because Congress has repeatedly refused to grant similar power to the CAB in the international rate field. CAB can block fares through its control over International Air Transport Association rate and fare resolutions, but it can't specify the fares.

The British would also extend rate control to include "agency commissions," and "applicable conditions governing amenities provided such as standards of accommodation and free baggage allowance."

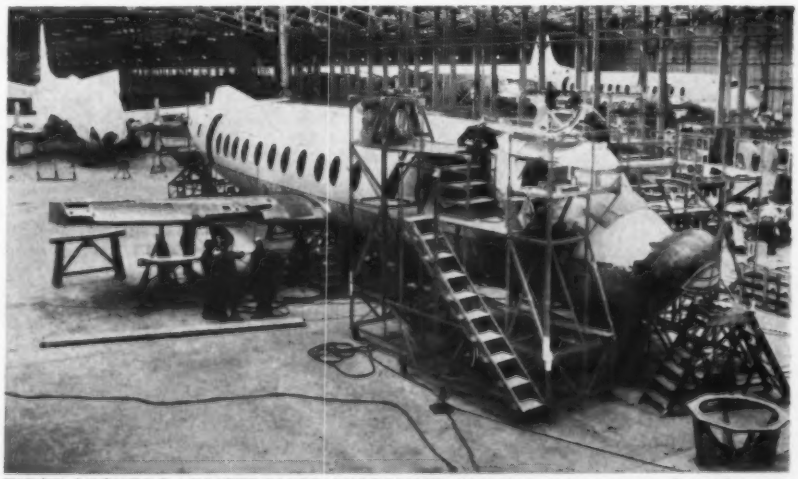
Items that bear watching

As for restrictions on aircraft changes, the British reportedly favor a prohibition against a regular change of aircraft along a route except in an emergency or when special arrangements have been made.

Other items which bear watching in the resumed talks include a British request affecting present rules on "designation of carriers" by parties to the agreement, so-called "capacity provisions" and a proposal to restrict an amended agreement to a temporary life, such as five or seven years. The temporary nature of such an agreement could, U.S. officials feel, affect necessary financing and planning of the U.S. companies.

Initially, there is U.S. concern over the potential effect on U.S.-U.K. air operations under the U.K.'s proposed amended agreement. Perhaps more sig-

Viscount 810—and Hughes' personal Viscount



FIRST VICKERS-ARMSTRONGS VISCOUNT 810, latest in company's turboprop transport series, is well along production line. Shrouded aircraft in background is Howard Hughes' Viscount. It is awaiting Hughes' orders to be delivered. Plane is roped off and no one may go near it without permission of Hughes' representative.

nificant from the U.S. viewpoint, however, is the effect such changes would have on future agreements with other countries.

It could open a new era of "language concessions" to rival or supplant the so-called "route give-away" era through which we are now passing.

Airlines must increase earning power, says banker

The key to successful financing of jet age equipment by the nation's airlines lies in "increased earning power *now*," T. Carl Wedel, vice president of the First National City Bank of New York, told members of the Aviation Writers Association in St. Louis.

Speaking at a dinner sponsored by the Air Transport Association at AWA's annual convention, Wedel said that even the best airline must earn a return of more than 11% of its book worth in order to attract the money it needs for jet equipment.

"This increase in earning power can only be attained in the amounts necessary by allowing airlines to charge the right price for their main product —available seat miles," Wedel said.

The speaker pointed out that the airlines' job in getting financing will not be easy, but that if necessary cooperation from the financial and regulatory agencies is obtained "it will be done."

No airlines have arranged for all the financing needed over the next decade. In order to get this financing they will have to follow certain ground rules which are set up by the competitive situation in the financial markets of the free enterprise economy, Wedel said.

Concluding his talk, Wedel pointed out that:

A substantial amount of borrowed money is available for airlines provided that the amount of the annual maturities of this debt do not exceed break-even cash generation in the future. The amount of money available is, at some point, limited by the amount of book net worth of the airline. Thus the carriers must face the prospect of selling additional equity securities plus increasing the company's retained earnings.

The airlines "better have a long talk with the man who will represent them in the fare investigation in Washington."

Hongkong Airways starts Tokyo service

Hongkong Airways Ltd. inaugurated twice weekly service between Tokyo and Hongkong this month with a fleet of two Vickers Viscount 760Ds.

Service is via Iwakuni and Taipei. Hongkong Airways, a non-IATA carrier, is jointly owned by British Overseas Airways Corp. and Jardine, Matheson & Co Airline will use the IATA tourist fare structure on the route.

By mid-July, BOAC and HKA will provide five times weekly service—all with turboprop equipment, Britannias and Viscounts. Capt. R. S. Colvin, formerly a senior pilot with BOAC, is general manager and operations officer of the Crown Colony-based airline.

Hongkong Airways also operates between Hongkong and Seoul, Korea, twice weekly via Okinawa, and between Hongkong and Manila three times weekly.

Closeup of Russia's new four-turboprop Ukraina transport

THIS FIRST CLOSEUP of the Soviet's new four-engine, 84-passenger Ukraina turboprop transport provides a more revealing view of the nose section, engines and undercarriage. Russian sources claim fuel consumption of the Ukraina engines is lower than for the Vickers Viscount's Rolls-Royce Darts. Picture was published in current issue of Grazhdanskaya Aviatsiya.

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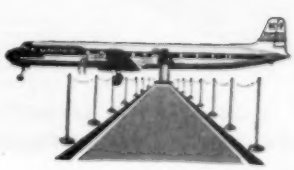


Should U.S. guarantee loans to small airlines?

CIVIL AERONAUTICS BOARD has gone to Congress with a proposed law under which the Government would guarantee private loans made to small airlines for re-equipment purposes.

The proposal increased to three the number of pending Congressional plans aimed at making re-equipment financing attainable for local service airlines and others of somewhat similar size. Previously in the hopper were the so-called Capital Gains bill and an Equipment Trust Certificate bill.

Carriers that would benefit from any or all of the bills are currently subsidized at the rate of about $30 million annually, according to CAB estimates. CAB explained the situation this way:

"A serious deterrent to improvement in the financial position of the local service carriers and the carriers operating wholly within the Territories of Alaska and Hawaii has been the relatively high cost of operating types of aircraft which have been available for the short-haul type of service for which these carriers are certificated.

"New aircraft are being developed, which it is believed, will be much more economical and efficient. However, the cost of acquiring such new aircraft will be so great as in all probability to render the aircraft unavailable to the typical local service and short-haul carrier, on reasonable terms, without governmental assistance of some kind."

Chances of passage slim

But while all three of the pending bills obviously would be of advantage to the airlines, passage of even one in the short time remaining before Congress recesses would appear to require a major effort. Also, if all three bills come to a head in Congress at the same time, as appears likely, it is conceivable that one proposal may be played off against the others because of the time element.

Broadly speaking, the local and territorial airlines would like all three bills passed. But if forced to take a choice, the carriers give no signs of being unanimous in their likes and dislikes.

Idea behind the Capital Gains bill is that subsidized carriers may retain profits made from the sale of old aircraft. This is opposed to CAB's long-standing position that such profits should be recaptured by the government through an offset of the profit against the carrier's subsidy need.

The bill failed of passage in Congress last year, was revived this year and is expected to be set down for hearings before the House Commerce Committee shortly.

The Equipment Trust Certificate idea is new to the airlines but actually is borrowed from the railroad industry. As an airline bill, it was introduced in Congress last month by Rep. John J. Flynt, Jr. (D-Ga.). Technically, it contemplates an amendment to the Federal Bankruptcy Act to make equipment trust provisions, now applicable to railroad equipment, applicable also to aircraft and parts.

The idea is that a local carrier, for example, could borrow money from a financial institution to buy new airplanes. The lender would then obtain an equipment trust certificate on the airplanes purchased. The certificate would amount to a first lien on the property and, if the airline went bankrupt, the holder of the certificate could take immediate possession of the airplanes.

CAB's guaranteed loan proposal, meanwhile, is considered the agency's substitute or replacement for prototype legislation. The old prototype bill contemplated a financial outlay by the Government to encourage manufacturers to develop a suitable airplane for feeder-type services. The new loan legislation—CAB emphasizes it is not a "money bill"—recognizes the proximity of suitable aircraft and offers a government guarantee for monies lent to airlines for new equipment purchases.

Specifically, the Board proposes to guarantee up to 90% of any loan made under the new law. Total guarantee loans to be permitted for any one company at one time would not exceed $5 million. But a provision in the new law would grant the agency flexibility to guarantee more than 90% and more than $5 million per company in cases where "the air carrier would be unable to obtain necessary funds for the purchase of needed aircraft on reasonable terms."

Financial houses skeptical

Behind all of these proposals is the cold fact that financial houses consider the small airlines too risky for large outlays without guarantees not currently available.

It was with this in mind last December that CAB Chairman James R. Durfee, supported by the Board, advised the local industry that CAB would ask Congress for a new law to permit government guarantees for equipment loans.

During the first week of April, 1957, CAB sent a draft of its proposed law to the Bureau of the Budget for Administration clearance. Since Budget is an office of the President, the action was, in effect, a request for

Cold fueling boosts capacity of DC-7C tanks

KLM DC-7C was able to take off with equivalent of 450 gal. extra fuel for a nonstop Long Beach-Paris hop by use of cold fueling. Douglas transport tanks were loaded with 48,266 lbs. of chilled fuel. Under normal-temperature conditions, tanks' capacity would be 2,816 lbs. less. Members of refueling crew, wearing protective clothing, sprayed mixture of ethylene glycol and water on wings to prevent ice forming.

White House approval. Reportedly, CAB had hoped to get the bill out of Budget and up to Congress by about April 15.

But a fight, which could be a tip-off to what will happen on this subject in the next two months in Congress, developed when Budget and the Treasury Department refused to approve the proposal. Financial houses which apparently prefer the Equipment Trust Certificate plan found their arguments voiced in the fight against CAB's plan.

When it appeared the proposed legislation might be defeated "by default" through lack of action in Budget, all five CAB Members and top staff officials made a novel appearance at Budget to overcome the opposition.

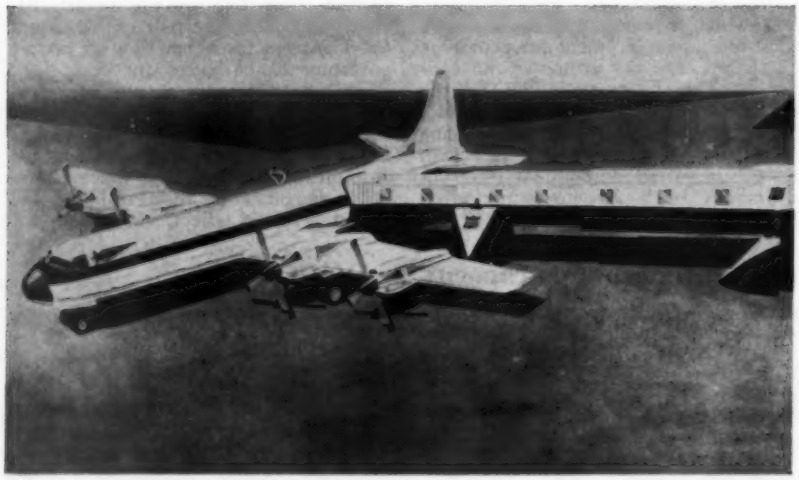
Top industry group suporting the CAB plan was the new Association of Local and Territorial Airlines made up of six local service airlines and several territorial lines. When CAB apparently broke the "log-jam" late in May and shook the bill loose from Budget, ALTA's executive director and former CAB Member Joseph P. Adams wired his membership that it represented a "maximum effort and spectacular support" of the industry by CAB.

Other elements of the small carrier industry were not as enthusiastic. Some felt CAB was pushing the guaranteed loan idea as a means of defeating the apparently powerful Capital Gains bill. Others felt that Congressman Flynt's equipment trust bill was one that could pass without impact on the Capital Gains bill and still make new financing possible.

CAB officials disclaimed an intentional connection between the guaranteed loan idea and their opposition to the Capital Gains bill. Although all three of the pending bills have made it to Congress, none of the arguments raised has been resolved; the stage has merely been set for a hectic couple of months "on the Hill," months which might see the already-split local service industry divided even more sharply.

It was disagreement on such issues as guaranteed loans, etc. that caused the six local lines last January to quit the Conference of Local Airlines, headed by John F. Floberg, and form the new group now headed by Adams. Whether those groups will now clash openly on Capital Hill remains to be seen. But while divided on methods, both groups agree on one thing—action is needed and at this session of Congress.

UAL to test covered moving gangplank



An all-weather covered gangplank to move passengers between plane and terminal will be tested by United Air Lines at Chicago's O'Hare International Airport within a few months.

Developed by Lockheed Air Terminals, Inc., Burbank, Calif., the "Aero-Gangplank" is a three-section elevated facility consisting of a self-powered telescoping span that bridges the second level of a terminal "finger" and the aircraft.

Unit has two supports, one fixed to the passenger concourse, the other a power-driven mobile dolly that pivots gangplank to the aircraft passenger door.

The gangplank can be retracted to 55 feet, extended to 107 feet and rotates 180 degrees.

S. V. Hall, UAL assistant vice president-facilities, says that if the unit meets the airline's functional requirements "it will be a major advance in speeding the comfortable transfer of passengers to and from our aircraft." He adds that UAL hopes to install units at existing and future air terminals designed with second floor boarding and deplaning areas.

A weather canopy shelters the entire gangplank and telescopes as length of unit changes. Limit switches slow extension of loading facility as it approaches plane. Movements of gangplank are directed by an operator just inside the plane-side of the structure. Interior is lighted and fitted with non-skid floor surface. Unit is made of steel.

Handley Page offers Dart-engined Herald

Handley Page Ltd. is offering its Herald 36-44 seat pressurized transport with two Dart engines as an alternative to four Alvis Leonides Major powerplants.

Dart-Herald is being adopted with minimum redesign and maximum component interchangeability. Centerwing is reworked to have single nacelles moved outboard to give two-foot propeller tip clearance without moving the main gear.

Rolls-Royce RDa 7 Mark 527 engines rated at 2,105 tehp, will be identical with Viscount engines forward of firewall.

Weight saving is about 3,000 lbs. but the increase in fuel required will keep the gross weight of the Dart-Herald similar to that of the 4-engine Herald.

Other data:

Maximum takeoff and landing weight	37,000 lb.
Takeoff power	2x(1,910 shp plus 502 lb. static thrust)
Rate of climb at 10,000 ft.	1,250 ft./min.
Service ceiling	29,500 ft.
Cruising speed at 15,000 ft.	275 mph
Range with max. payload, 10,160 lb.	657 miles

Eastern, Navy award reseal jobs to Cee-Bee

Cee-Bee Chemical Co. at Downey, Calif., has been awarded a $900,000 prime contract by Eastern Air Lines for complete desealing, repair, rework and resealing of integral fuel tanks in 17 Constellations. Another 29 planes may follow.

Cee-Bee also has received a $500,000 Navy contract for the same type of tank work on 12 R5D aircraft. Work on the EAL Constellations will be performed at the On Mark Engineering Co., Van Nuys, and on the Navy's Douglas R5Ds at Twentieth Century Aircraft, Burbank.

It is estimated the rework on the Constellation tanks will require 7,000 manhours per aircraft. On the R5Ds, the estimate is 5,000 hours. Cee-Bee process, which will be used by On Mark and Twentieth Century in doing the actual work, incorporates a structural repair and rebuild operation which Edwin Giddings, vice president and sales manager, describes as essential for a leak-proof job. Cee-Bee guarantees its jobs for two years.

The Cee-Bee method originally was developed by Douglas Aircraft Co. and later released to the chemical company.

Cee-Bee became interested in this type of work when it developed a mechanical method of applying desealing chemicals to integrated fuel tanks.

Previously tanks had to be stripped by hand application of chemicals and scraping, or by fill-and-drain, both time consuming and costly.

Fire safety tests for jets needed NOW

by Richard van Osten

LOS ANGELES—Fire safety tests and procedures needed to combat the complexity of future jet transport hazards must be carried out while these aircraft are under development—not after they have passed into obsolescence, a CAA official warned National Fire Protection Assn. members here.

Addressing NFPA's annual aviation seminar, A. L. Morse, who heads the aircraft division at CAA's Technical Development and Evaluation Center, cautioned that we must know tomorrow's aircraft, not merely approximate a picture of them.

Morse declared the development of non-flammable fuels and lubricants is of vital importance. He suggested the possible use of a removable inhibitor or a combination of two fluids which would become combustible only when combined.

Other items that should be developed, he said, are: airborne vapor detection devices, reliable fire detection methods for powerplant areas, automatic discharge systems for extinguishing agents, fireproof wiring coatings and instrumentation systems to evaluate firefighting methods without setting the ship on fire.

Other relatively new fields Morse said should be probed for their influence on fire safety are: the effect of high-energy radar waves on fuel concentrations, aerodynamic heating of fuel tank areas in high-speed transports and the high refueling rates that will be required with jet transport operation.

Refueling hazards discussed

The subject of refueling hazards was given further impetus by C. S. Parker, senior engineer in field equipment and facilities engineering for American Airlines.

Parker expressed concern over the possible vapor hazards in and around the area of the wing-tip vent lines on the Boeing 707 and the Lockheed Electra, both on order by American. He declared the 707 to be the most serious problem only because of the amount of fuel it carried, although he said both aircraft need further investigation. He added that Boeing is conducting extensive tests for further information on possible vapor problems during ground refueling.

The results of preliminary tests indicate it may be necessary to restrict movement of vehicle traffic around the wing-tip area during refueling. Some sort of blower system may be required to disperse the vapors.

Of the two fuels being considered for commercial jet operation, Parker said American favored the kerosene-type ASTM-A rather than the JP-4 type ASTM-B, because of the lower flame propagation rate, more BTUs per gallon and less "boil-off" loss characteristics of the kerosene-type fuel. He admitted that this was still a controversial subject among airline operators.

Parker also said that fuel trucks would prove impractical for efficient jet refueling and the hydrant system would replace them.

Deputy Chief Don T. Hibbard of the Los Angeles Fire Department told of the problems involved in trying to use existing airport fire truck equipment on some modern aircraft as well as difficulties to be anticipated.

"The length of aircraft is becoming a problem," he said. "We must have new trucks with greater reach, or more trucks."

Hibbard emphasized the fact that longer runways for jet operation will require more fire stations and more equipment to put rescue operations into effect in as short a time as possible.

"When we realize that the 20,000 gallons of fuel in a DC-8 generates 2½ billion BTUs, we can no longer use the standard two-to-three-minute evacuation schedule when there may be 100 to 150 passengers involved."

"Present portable evacuation ladders are inadequate," he said. "We should develop something along the lines of a portable escalator."

Describing the problem of rescue techniques as "a staggering one," Hibbard noted that the 64 major airports in the U.S. have "64 different solutions," with the use of foam extinguishing agents as "the only thing agreed upon."

The chief of North American Aviation's fire department, W. S. Jacobson, related some of its fire safety problems in connection with jet-fighter operations and suggested that the airlines could probably profit from the military's experience.

Some military experience with fires in jet aircraft was presented by Col. John A. Herrington, Chief of the Engineering Branch, Flight Safety Research, USAF Office of the Inspector General. He declared that on a rate-per-hour basis, there are five times more fires in jet aircraft than in non-jet.

Col. Herrington cited two possible fire sources peculiar to jet operation as the use of compressor bleed air of 600° to 800°F to drive accessories and the increased airspeed converting cooling air to "an ignition source." A two-year survey of accidents in which fire was involved totalled 198 incidents, 172 of which were jet and 26 non-jet, he said.

Woodruff "Woody" DeSilva, manager of Los Angeles International Airport, told the seminar that the jet was "just another airplane" and "we can deal with its problems the same as we dealt with the first DC-3 or DC-4."

Aerial throneroom for The Negus

THIS PLUSH INTERIOR of Ethiopian Airlines' 749 Constellation was designed by Lockheed Aircraft Service, International, for use by Haile Selassie, emperor of Ethiopia. The Connie can be transformed quickly into either a 44-passenger first-class commercial transport or a high-density aircoach.

Small turbojets put new life into 'Flying Boxcar'

Converted C-82 shows improved speed, climb and stability in flight tests with auxiliary powerplants

STEWARD-DAVIS, INC. of Gardena, Calif., believes it has the answer to the marginal single-engine performance of Fairchild C-82s when flying at high gross weights.

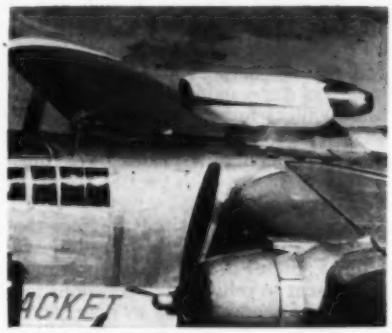
The original Pratt and Whitney R2800-85 engines do not provide the "Flying Boxcars" enough power to maintain extended single-engine flight with heavy loads. Many C-82s were sold as surplus and Civil Aeronautics Administration grounded the aircraft except for agricultural purposes.

This order left civilian purchasers with an aircraft that could carry a 19,000-pound payload faster and at a lower cost per ton-mile than any other twin-engine transport, but they couldn't fly it.

Steward-Davis conducted a series of thrust, aerodynamic and stress studies of the aircraft that resulted in the decision to install small turbojets to make the C-82 safe and versatile. Selecting a modernized version of the Westinghouse 19B2B powerplant, now called the J1600 Turbassist by Steward-Davis, a prototype installation was made on a C-82 by the Acme Aircraft Co., Torrance, Calif.

Referred to as a JET-PAK 3200, two of the J1600 units were mounted side-by-side above the fuselage where maintenance would be simple and the jets would not be subject to dirt and foreign objects thrown by the propeller. The completed conversion of the C-82 is called a JET-PACKET.

Flight testing of the jet installation was done with Lester Coan and Clyde Pangborn at the controls, both being CAA-designated test pilots. Preliminary flights indicated the aircraft's stability was unaffected by the installation. An early speed test registered a



JET-PAK mounted on C-82.

25-mph gain in speed with one turbojet at takeoff power and both piston engines at cruise power.

Using the jets on takeoff at a gross weight of 47,000 pounds, Steward-Davis reports the JET-PACKET climbed to 10,000 ft. above the take-off point in 5½ minutes from the start of the roll. Both piston engines were then feathered with the jets operating at cruise power and the IAS held at 130 mph. The rate of descent under the same flight conditions, was found to be 450 ft. per min. at 11,000 ft., the rate decreasing during the descent to 8,000 ft.

At 5,400 ft., during a single-engine climb with flaps and gear up and without jets, the rate of climb was 50 ft. per min. Starting again at 5,400 ft. with both jets and one piston engine at METO power, a 535-ft, per min. climb was averaged to 9,400 ft.

Both pilots noted the absence of adverse handling or control characteristics with the jets on or off and reported improved stability at extreme high angles of climb and slow speeds. Directional control during single piston engine operation appears easier and more effective as the fuselage centerline installation of the jets amounts to moving the average line of thrust approximately 6 ft. inboard.

Certification flights of the JET-PACKET are scheduled to take place in Mexico for the Mexican authorities and production of JET-PAKS will be at the Mexico City facilities of Servicios Aeronauticos de Mexico, under the supervision of Charles Hall, former assistant chief tool designer of Convair.

Kits for the JET-PAK will be available in both single- and twin-jet units. The single (J1600) is priced at $26,000 and the twin unit (J3200) at $51,000.

The Men Who Are Air France

No. 7 OF A SERIES

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A SENIOR AIR FRANCE CAPTAIN

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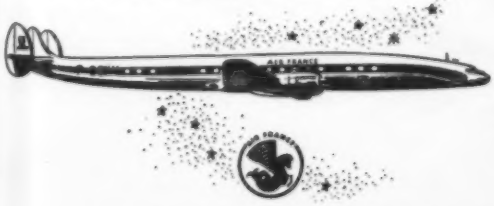

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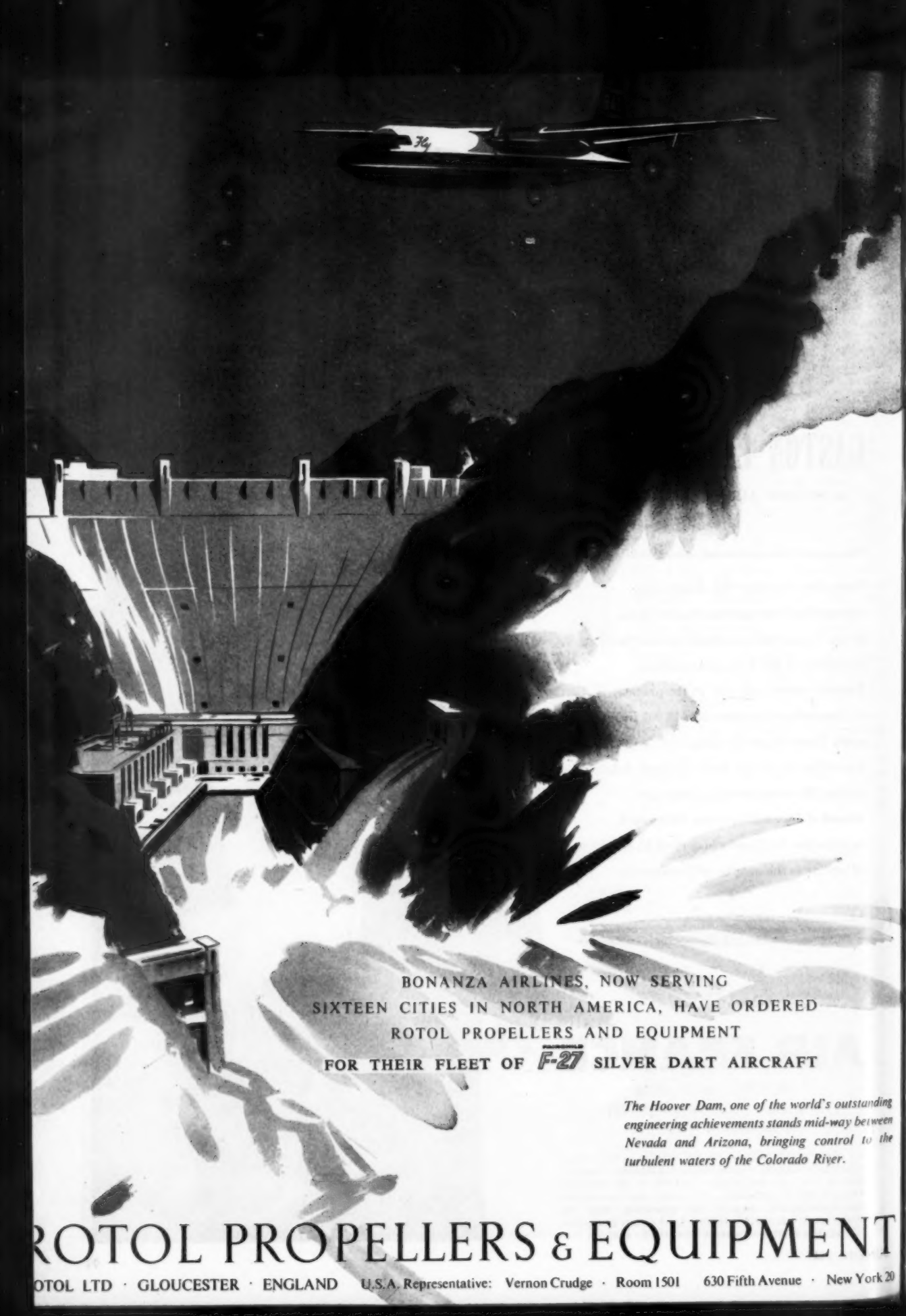

BONANZA AIRLINES, NOW SERVING
SIXTEEN CITIES IN NORTH AMERICA, HAVE ORDERED
ROTOL PROPELLERS AND EQUIPMENT
FOR THEIR FLEET OF F-27 SILVER DART AIRCRAFT

The Hoover Dam, one of the world's outstanding engineering achievements stands mid-way between Nevada and Arizona, bringing control to the turbulent waters of the Colorado River.

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Readers offer suggestions

By Eric Bramley

Two issues ago we noted that the airlines may shortly have another public relations problem. The use of blast fences on either side of gate positions is planned when jet transports are in operation. But the description "blast fence" may not have a good effect on passengers, so we asked for suggestions. There have been quite a few. They include air arrestors or airrestors, air stops, air shields, wind guards, jet fences and revets. Particular thanks to the following for contributions: F. C. McMullen, Western Electric's supervisor of government communications sales; Clay Bernard, Western Air Lines' regional sales manager, San Francisco, and Jim Beattie, Pasadena, Calif.

We like Northwest Airlines' new method of handling damaged baggage. Henceforth, passengers who approach NWA with lost or damaged baggage claims will be referred to a luggage dealer who will act as NWA's agent. The company sees three advantages in this method: (1) it releases sales and operations employes from the task of handling claims; (2) it should save money; employes have made compromises favorable to claimants in order to retain passengers or because they weren't expert enough to dispute an exorbitant claim; (3) it puts the claimant in touch with a luggage expert who knows the validity of the claims because he knows baggage. NWA has named one luggage company in each of its medium and larger-sized cities. Employes will handle claims at small stops. Incidentally, NWA last year carried 1,427,063 passengers and received 1,472 damaged bag reports. Only 60% of reports proved valid and resulted in payment of claims (which averaged $10). NWA pays off on about four "lost" claims a month.

We protest, mildly, over the way Beth Day handled us in her book, "Glacier Pilot," the story of Bob Reeve, pioneer Alaskan bush pilot, now president of Reeve Aleutian Airways. Mrs. Day says we printed "as truth" the yarn about how hard it is for Reeve to keep pilots because of the hair-raising weather along his routes. Bob Reeve's story is that the company takes "a pilot's pants and shoes away from him every time he returns to Anchorage from a trip, so that he can't escape to the States. At the end of a six months' probationary period he gets his pants back; six months later we return his shoes. By that time he's toughened up, and decides that the route isn't so bad after all." After an Alaskan trip in 1952 we wrote a story about Reeve and said he told us this story "jokingly." Thus our protest, but only a mild one because "Glacier Pilot" is excellent and we recommend it highly.

Odds and ends: United Air Lines has a "million miler" who can prove it. He's J. A. Denton, Portland sales engineer, who has all his ticket stubs since 1948. Started collecting them when the income tax boys scoffed at his $12,000 deduction for air travel . . . Congratulations to West Coast Airlines on its "Friendship Manual." Contains route map, company history, complete city index listing population, climate, hotels, etc., on-line fares, and other useful information. An excellent job.

Sales, Traffic, Promotion

New passenger service features have been introduced by **TWA** on its Sky Club air coach schedules, being operated with 32 refurbished Constellations. Available for purchase are hot and cold drinks, cocktails and highballs, and snacks. Bassinets are supplied for babies, and older children are given comic books and lollipops. New cabin interior was designed by Monroe-Culbreth. . .

Delta Air Lines has ordered IBM 305 RAMAC (Random Access Method Accounting Control) equipment which will handle reservations electronically. Equipment will be delivered in about two years . . . Delta has a lighted signboard 48 ft. high and 90 ft. long on Atlanta's North Expressway. The sign, which plugs DC-7 service, has more than half a mile of neon tubes. Letters are 10 ft. high . . . It's as "quiet as a mouse" is the theme of Delta Convair 440 promotions in Charlotte, Washington and Atlanta . . .

Pan American World Airways named Kudner Agency to represent it within the U.S. on its Clipper Cargo advertising program . . **Scandinavian Airlines System** opened a ticket office at 71 Broadway to serve New York's financial district.

Latest innovations to make life easier for passengers

RECENT EQUIPMENT DEVELOPMENTS include a new four-wheel truck (left) for carrying baggage at airports, and a drawer-type leg rest for airplane seats. The all-steel truck, developed by Lewis-Shepard Products Inc., Watertown, Mass., is 40 inches high, 96 inches long and 52 inches wide. The V-type deck has a four-inch slope and is 24 inches from ground level. Truck is available in capacities to 2,000 lbs. The leg rest, which is self-adjusting and requires no legs to the floor, has been incorporated in luxury chairs made by Hardman Tool & Engineering Co., Los Angeles. It slides into the bottom of the seat when not in use. Leg rest is also available in kit form for modification of existing Hardman seats.

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VERTOL H-21 ARMY HELICOPTER
1199 Mile World's Distance Record
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First Non-Stop Transcontinental Helicopter Flight with In-Flight Refueling August 23 and 24, 1956

SIKORSKY H-34 ARMY HELICOPTER
World's Speed Record for 100, 500 and 1000 Kilometers, July 12, 1956

The two craft shown here use Vickers pumps, motors and valves for a variety of important operations.

• • • • • •

New and unusual applications for hydraulics are being scheduled into several of the newer helicopter designs. Among these are hydraulic motor operated fuel transfer pumps and hose reels. Vickers Hydraulic Equipment will also be used for taxiing, rotor fold, starting, rescue hoist systems and auxiliary electrical power generation.

• • • • • •

Ask our nearest application engineer to tell you about them, or write for bulletin 7504.

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REPRESENTATIVE VICKERS HYDRAULIC EQUIPMENT FOR HELICOPTERS

7637

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

TRANSPORT TRENDS

Biggest potential new route case brewing at CAB involves American Airlines' bid for nonstop rights between San Francisco and New York. American now serves these points, but with a required stop at Chicago. United Air Lines and TWA have nonstop rights and oppose AA's bid. But strong California congressional and civic support for proposed new service may lead to a full-scale transcontinental route case.

U.S. appears skeptical on eve of resumed bilateral talks with the British (see story, page 81) and is dispatching a two-man team to London instead of a full-fledged delegation. Purpose appeared to be to determine if British are prepared to discuss two long-standing route proposals for U.S. carriers or desire to talk only proposed revisions of the text of existing U.S.-U.K. agreement.

Domestic scheduled airlines proposal to assess a $3 penalty against "no-shows" goes into effect Sept. 15 on a 10½-month trial basis. CAB has approved, but "reserves jurisdiction" to review during the trial period.

International airlines are worried over the trend toward arbitrary increase of landing fees. Britain's landing fees were hiked about 50% June 1 and IATA estimates this will cost international carriers about $1.4 million annually. Canada will raise landing fees for transborder operations July 1, resulting in an additional annual cost of $100,000 to airlines.

Look for Greece's Olympic Airways to start transatlantic operations next year. By 1960, new carrier, headed by shipping magnate Aristotle Onassis, may well be one of world's major foreign flag airlines. Company is working closely with France's independent airline, UAT-Aeromaritime, from which it is chartering DC-6B equipment pending delivery of its own DC-6Bs.

An internal investigation of an apparent leak of "confidential files" in connection with pending New York-Mexico City Nonstop Case is being conducted by CAB. After investigation, Board will determine whether to turn the matter over to Justice Dept. for possible violations of Espionage Act. Secret information involved, however, was available to other branches of the government and to certain airline attorneys and was not necessarily leaked from CAB.

Some Iron Curtain countries are turning to the West to modernize their airlines fleets. Poland's LOT, for instance, is looking for used British equipment, with particular attention toward acquiring some BEA Elizabethans. At present, LOT operates DC-3s and I1-12s. With trend toward improved relations between Poland and the West, the airline wants to provide competitive service from Warsaw to western capitals, since several western carriers already fly to Poland with DC-6s and Convair 440s.

CAB's proposed guaranteed loan legislation for local service and territorial airlines (see story, page 85) is gaining momentum in Congress, now appears certain of passage at this session. Senate Commerce Committee will hold hearings on bill June 17-18. House committee is expected to follow with early hearings. Key industry backer is former CAB member Joseph P. Adams who last week registered as a lobbyist.

Frye proposes F-2, turbojet/turboprop transport that will carry 79 passengers, cruise at 205 knots

Frye Corp. of Fort Worth, Tex. has launched a new entry for the "DC-3 replacement" market, a four-engine combination turbojet and turboprop capable of carrying up to 79 passengers in an airbus configuration.

Basically a "paper" design proposal, the Model F-2 "Safari" would accommodate 65 passengers in a deluxe layout or 73 passenger with a coach interior. Frye also proposes use as an all-cargo carrier and for combination passenger/cargo service.

F-2 would have a cruise speed of 205 knots using turboprops only at maximum cruise setting at 10,000 ft. altitude. Range using 8,450 lbs. of fuel, assuming 45 min. reserve, would be 668 nautical miles; with 17,000 lbs. fuel, range becomes 1,615 n. mi.

Powerplants would be two Rolls-Royce Dart turboprops mounted inboard and two unnamed turbojets in the 2,200 to 2,650 lbs. thrust class outboard. Front-running powerplant for this latter location is believed to be General Electric's J85.

Design study report being circulated by Frye to potential customers calls for a high-wing configuration with a retractable tricycle landing gear. Cabin would be pressurized to maintain an 8,000-ft. altitude for operation up to 15,000 ft. and the forward fuselage retains the "Vistaramic" nose lounge characteristic of the original Frye F-1.

F-2 would have a design gross weight of 50,000 lbs., landing weight of 47,500 lbs., and zero fuel weight of 47,000. Payload-plus-fuel would range from 19,891 lbs. for the de luxe passenger arrangement up to 24,880 lbs. for cargo operation. Coach figure would be 19,946 and that of the passenger airbus, 20,676 lbs.

Aircraft measures 89 ft. 3.5 in. long, has a wingspan of 109 ft. 6 in. and height at tail of 30 ft. 5 in. Compared to the Frye F-1, this represents a 10-ft. stretch in fuselage while retaining the same span and tail height.

Dart engines for the new model would be the R.Da.7 Stage 2 turboprops rated at 1,910 shaft horsepower at sea level static thrust and providing an additional 505 lbs. jet thrust for maximum takeoff. Maximum continuous power rating would be 1,750 shp plus 445 lbs. jet thrust.

Behind Frye's proposal for the combined powerplant arrangement in the F-2 is the operating concept of using four-engine power when needed for takeoff, climb, etc. with two-engine turboprop economy for use in normal cruise and descent.

F-2 would have a fuel capacity of 1,300 gals., but additional capacity is being offered as optional equipment.

Army Hawk missiles ready for launching

ARMY'S NEW HAWK surface-to-air guided missile is designed to knock down flying aircraft at distances sufficient to protect defense areas. Missile's radars detect and track aircraft in blind zone of conventional radar. Hawk will complement high-altitude protection of Nike. Marines also will use new missile as mobile weapon.

PAA passenger traffic nears 3-million mark

Pan American World Airways expects to carry close to 3 million passengers this year if the present trend continues, according to Juan T. Trippe, president. Last year PAA hauled 2.6 million passengers.

During the first four and a half months this year the carrier is running well ahead of the corresponding period of 1956. Increase in transatlantic operations is 24%.

Cuban airline orders Boeing 707, Britannia

Cubana has purchased two Bristol Britannia turboprops and two Boeing 707 jets for delivery in 1958 and 1960. Announcement of the Britannia order confirms the carrier's plan to introduce the British turboprop in Havana-New York and Havana-Madrid service next year.

Congress approves report increasing CAA, CAB funds

Congress has adopted a conference report calling for increases over amounts granted by the House to CAA and CAB for the fiscal year beginning July 1.

The bill allots $181,747,800 for CAA operation and regulation; $124,603,525 for establishment of air navigation facilities; $25,000,000 for grants-in-aid for airports; $675,000 for hire of aircraft; authorizes operation of 92 aircraft and allows $218,000 for administrative expenses connected with air navigation development.

The bill provides $5,489,400 for CAB salaries and expenses and $37,228,000 for subsidy payment to air carriers.

Conference delegates' visit to White Sands blocked

Delegates attending the National Telemetering Conference in El Paso, Tex., were subjected to what was called a "political move" to call attention to limited military funds available for research and development.

The accusation was made by Lawrence W. Gardenhire, Radiation, Inc., conference chairman, in a telegram to Sen. Dennis Chavez (D.-NM) protesting last-minute cancellation of a visit to White Sands proving ground by conference delegates to view missile firings.

According to Gardenhire, the Pentagon had approved the firing schedule more than a year ago. It called for NTC engineers to witness firings of Little John, Pogo-Hi and

Talos missiles and operation of the telemetry gear. Col. J. B. Leon Hirshorn, acting Army Commander at White Sands, explained the cancellation was forced by a Pentagon order curtailing overtime authorization at the proving grounds.

More than 70% of personnel at White Sands are civilians who are paid on a "portal-to-portal" basis for work on the 100-mile range. Display of the firings to the delegates near noonday would have required overtime pay.

Col. Hirshorn said the directive was not surprising at this time of the fiscal year. Operation of the proving grounds costs $42,000 per hour, he said, and getting to work at various points over the long-range distances poses an overtime payment problem unless firing occur early in the day.

Build giant cargo planes, AIA official urges

I. C. Peterson, director of technical services for the Aircraft Industries Association, wants Congress to vote extra money for the Air Force to reinstate development of giant logistic aircraft capable of moving heavy cargoes at low cost.

In AIA's official publication, *Planes*, Peterson wrote that modern airlifting operations have already achieved tremendous savings in dollars, manhours and material. The Air Force's airlift program for high-value cargo items has already saved the U.S. $9.8 billion—a figure equal to the total military request for aircraft and missiles in the fiscal 1958 budget, he pointed out.

F-27 operators may have joint overhaul base

Five local service and territorial airlines have tentative plans to establish a joint overhaul base to service Rolls-Royce Dart engines of the Fairchild F-27. Facility will also serve as a central parts and supply depot.

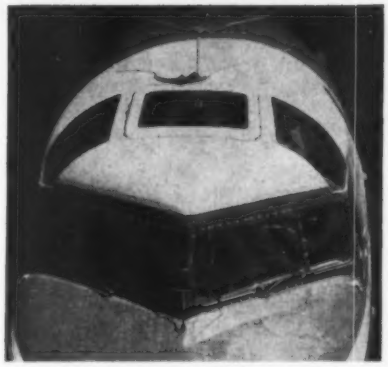
Lines involved are West Coast, Frontier, Bonanza, Northern Consolidated and Wien. Sites under consideration are Yakima, Walla Walla, Spokane and Everett (Paine Field), Wash.; Boise, Idaho; Portland, Oregon; Reno, Nev.; Denver; Phoenix and San Francisco.

France approves funds for Tahiti airport

France has appropriated about $5 million to build an airport at Tahiti in the South Pacific. When completed, within a few years, the terminal will open the island to tourist trade on a voume basis.

Lack of an airfield has been a drawback to extended tourist trade there. Present air service is erratic and infrequent by flying boat operated by Tasman Empire Airways, Ltd., from Suva in the Fiji Islands.

Roof-window installation increases visibility



Garrett Corp's "Green Hornet" DC-3 has been fitted with a roof-window installation that is said to increase pilot and co-pilot visibility 150%.

Garrett's Aviation Service Division engineered and installed 1,200 sq. in. of lucite above the crew compartment. Side panels are curved to fit the plane's contour while center flat panel doubles as an escape hatch.

Garrett officials say the modification was made as an anti-collision safety measure.

TWA to make new stock offering

Trans World Airlines will double its outstanding stock total through an offering of 3,337,036 shares within the next month. The new offering is in lieu of a debenture program first announced early in April.

Through transferable subscription warrants, mailed to shareholders, TWA will offer the stock on a basis of one share for each share now held. Price depends on the market at time of offering.

The airline has filed with CAB to gain necessary approval of an agreement with Hughes Tool Co., under which Hughes, current holder of 74% of TWA stock, would acquire the bulk of the new shares.

ARDC and MATS to move headquarters

Air Research and Development Command headquarters will be moved from Baltimore to Andrews Air Force Base, Md., and Military Air Transport Service will move its headquarters from Andrews to Scott AFB, Ill.

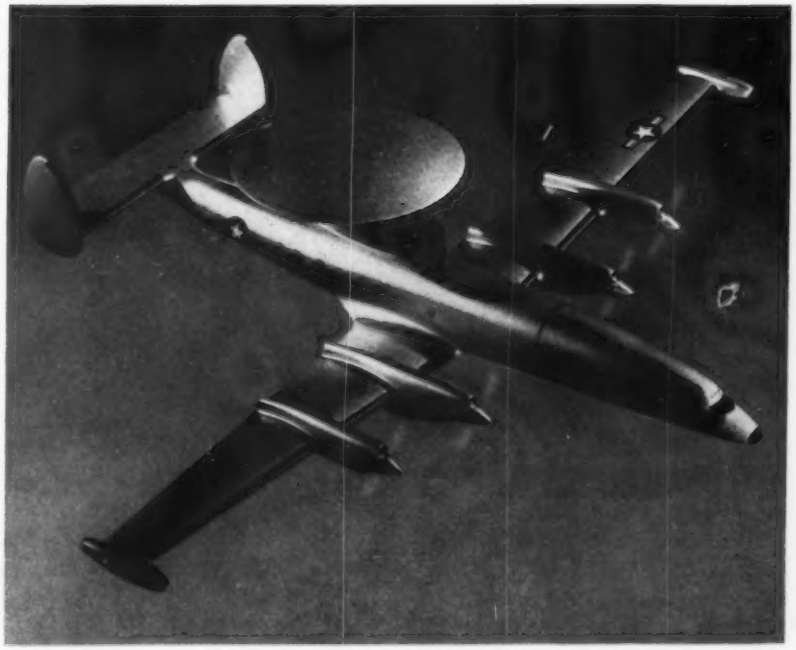
Moves will follow transfer of Air Training Command, now at Scott, to Randolph AFB, Texas, following Aviation Medical School switch to Brooks AFB, Texas.

Pan American seeks site for jet overhaul base

Pan American World Airways is studying selection of a site for a $25-million jet overhaul base in either the New York or Miami areas. Although all three PAA divisions (Latin American, Atlantic and Pacific) are bidding for the base, the carrier is concentrating its efforts on obtaining a site in New York or Miami.

Navy radar picket 1649A Starliner

THIS IS HOW the Navy version of the Lockheed 1649A will look with radar saucer parasol. Powerplants will be four Allison T56s, plus two Westinghouse J34 turbojets attached in wingtip pods. Initial engineering is under way at Lockheed's California Division.



BRIEFS

American Safety Razor Corp. has acquired all the capital stock of Com-Air Products, Inc. of Los Angeles, for $955,000. Com-Air makes hydraulic, pneumatic and fuel controls for aircraft and missiles.

An International Congress of Aeronautical Sciences has been established at Paris. First meeting will be held in the summer of 1958. Honorary President is Dr. Theodore von Kármán. Maurice Roy, head of ONERA (France's NACA), is chairman of the executive committee.

Charles S. Thomas has been reelected a director of Lockheed Aircraft Corp., a post he resigned when he was named Undersecretary of Navy in 1953.

Nomination of Malcolm MacIntyre as Undersecretary of Air Force has been approved by the Senate.

Angela Regina Minetti, wife of CAB member G. Joseph Minetti, died recently following a heart operation at Cambridge, Mass.

Lt. Gen. Laurence C. Craigie, USAF (ret.) has been elected to the board of Associated Missile Products Corp. He recently joined AMF as assistant to the Defense Products Group executive in charge of long-range planning.

Piasecki Aircraft Corp. has announced plans to develop a new monorail system. It is designing an "airail car" based on aeronautical principles which, president Frank Piasecki said will be capable of attaining aircraft speeds. Company is considering a tie-in with structural steel firms to provide rails.

Wiley R. Wright, former deputy administrator of the CAA, has been appointed assistant to the president of Northeast Airlines, effective June 15.

Credits totaling $4,295,000 have been given Loide Aereo Nacional S. A. (LOIDE), Brazilian airline, by the Export-Import Bank to help finance purchase of four Douglas DC-6As, spare engines and parts from United Aircraft Corp.

Ryan Aeronautical Co. estimates a payroll reduction of $120,000 a month as a result of the Department of Defense ruling cutting out overtime.

Douglas Aircraft Co. has dismissed two purchasing employees at the Torrance plant for accepting entertainment costing "somewhat less than $10,000" from a subcontractor. A third man is being investigated.

Robert McCullough, Temco president, predicts Temco will do $127 million in business this year compared with $90 million last year.

Alvin E. Hewitt and Addison B. Conroy, president and vice president of Aeroproducts Inc., were killed when their lightplane crashed during the Hayward-to-Tucson air derby.

Army said its Ordnance Guided Missile School at Redstone Arsenal has more than doubled in size in less than two years and is expected to double again within another year. Strength is 1,750, compared with less than 800 in July 1955.

Rohr Aircraft Corp. has opened its Auburn, Wash., plant for assembly of power packages for the Boeing KC-135 and 707. Rohr is also opening a new building at Winder, Ga., for assembling Lockheed C-130 power packages.

Firestone Tire & Rubber Co. has received a subcontract from The Martin Co. to develop and test components for the Matador TM-61B guided missile. Work will be done at Monterey, Calif., where company has Defense Research Division and Engineering Laboratory.

Chance Vought Aircraft, Inc., has received a $35-million Navy contract for continued development of F8U-3 fighter.

Flying Tiger Line will airfreight commercial JT3 jet engines from Pratt & Whitney's plant at East Hartford, Conn., to the Boeing plant in Seattle for use in the 707 jet liners.

Strategic Industries Association will hold its annual meeting at the Rodger Young Auditorium in Los Angeles June 25. Group will elect 15 directors.

Boeing Airplane Co. is building a $300,000 facility for testing its sound suppressor-thrust reverser. Building is at Renton, Wash., and will be completed by fall.

Los Angeles International Airport marked a new high in passenger traffic in the first quarter of 1957. A total of 967,521 passengers were handled, compared with 798,755 a year ago. Air carrier movements were 45,082, compared with 34,296 last year.

Chicago Helicopter Airways has received the first of three Sikorsky S-58 12-passenger helicopters. Other two are expected this month. They will go into service on the Midway-Loop-O'Hare-Midway circuit.

Aubrey Keif, aviation sales manager of the Texas Co., has been named Western Hemisphere aviation sales manager, a newly created position. Keif has completed 25 years with The Texas Co.

FINANCIAL

Kellett Aircraft Corp. realized earnings of $46,411 during the four months ending April 30. This tops the $45,122 earned during the entire year in 1956. May earnings, estimated at about $26,000, are expected to wipe out the deficit reflected in Kellett's last annual report.

Lockheed Aircraft Corp. reports net earnings of $3,415,000 for the first quarter of the year. Last year the total was $4,413,000. Development expense of the Electra is the reason for the decrease, the company said. Sales for the period were $195,479,000, up from $187,657,000 last year.

Capital Airlines reports revenues of $7,574,629 for April, up 55% over the same month last year. Operating income totaled $160,627, up from $49,191 a year ago. Net income of $132,450 compares with loss of $41,883 last year.

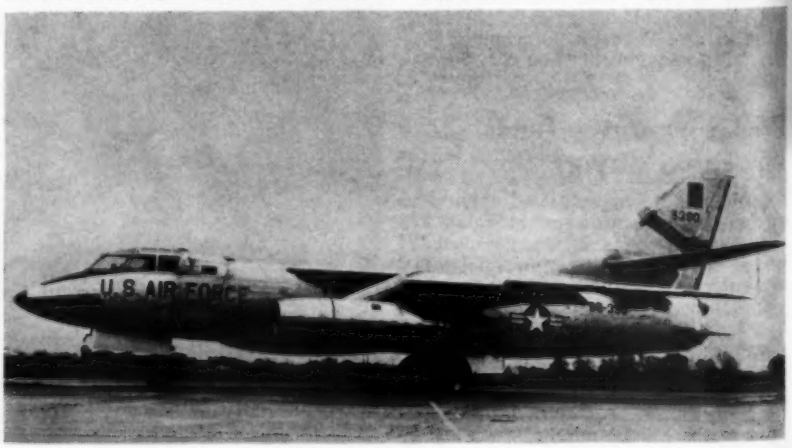
AMC urges manufacturers to get on qualified list

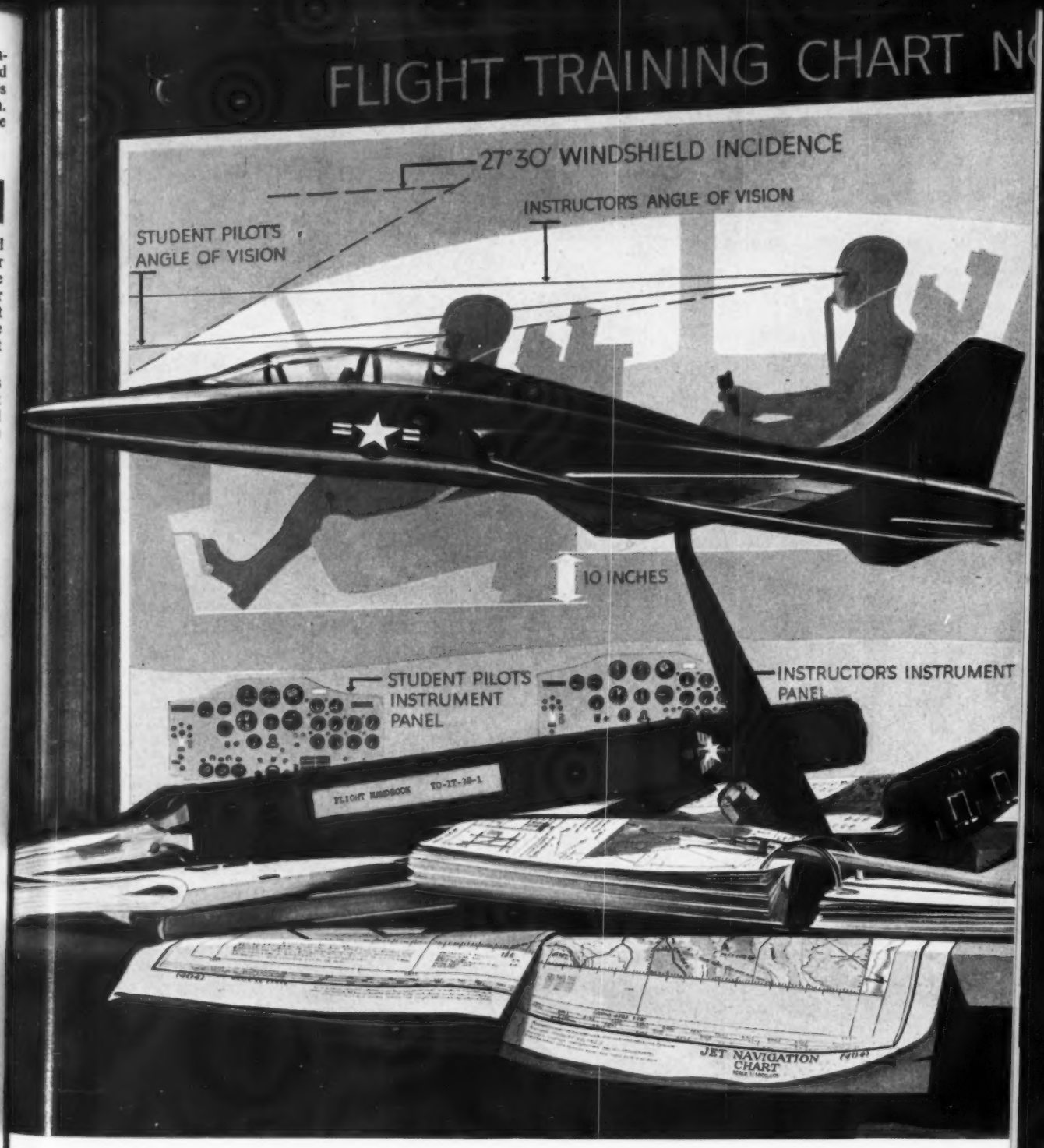
Air Materiel Command is urging manufacturers to have their products listed in the "Qualified Products List Summary." AMC pointed out that many Air Force Contracts have provisions limiting procurement to items contained in the list.

In order to get products listed in the QPL Summary, manufacturers must conduct tests of their products to make sure they meet specifications and certify these tests have been met.

Weather-recon B-66 ready for service

DOUGLAS WB-66D, weather-reconnaissance version of the B-66, completes family of airplanes designed as a team for all phases of a major tactical mission. Like B-66 and RB-66, it is powered by two Allison J71s, performs in 600-700 mph class.





SIMPLE ARITHMETIC– It costs approximately ten thousand dollars to send a student through college today, but more than ten times that amount to give a young man the superlative training that he must receive to become an Air Force pilot. A saving in either expense would be welcome to most Americans. Northrop Aircraft is *doing something* about reduction of national defense costs by applying "dollar engineering" to planning and production of new weapon systems. Latest Northrop achievement is its supersonic T-38 jet trainer, a simple, lightweight airplane capable of using any improved airport. Costing less to produce, fuel and maintain than other airplanes with comparable performance, the T-38 can save American taxpayers hundreds of millions of dollars in pilot training. This T-38 jet trainer... and the Snark SM-62, world's first intercontinental guided missile... are noteworthy developments of the budget-minded research, engineering and production teams at Northrop.

NORTHROP

NORTHROP AIRCRAFT, INC. · HAWTHORNE, CALIFORNIA

Builders of the First Intercontinental Guided Missile

Jet aircraft compressor blade produced by the Aviation Divisions of Kelsey-Hayes.

precision blades for flight propulsion

Superalloy blades, buckets and vanes—*precision components for rotating and static assemblies*—are products of the Aviation Divisions of Kelsey-Hayes. Kelsey-Hayes also produces through its own vacuum melting facilities, the special alloy metals that go into these and other products demanding high tensile strength in the high temperature field. Kelsey-Hayes Company, General Offices: Detroit 32, Michigan.

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15 PLANTS / Detroit and Jackson, Michigan; McKeesport, Pennsylvania; Los Angeles, California; Windsor, Ontario, Canada
Jackson, Michigan • Springfield, Ohio—2 plants—(SPECO Aviation Division) • Utica, New York—4 plants—(Utica Drop Forge and Tool Division) • Davenport, Iowa (French & Hecht Farm Implement and Wheel Division)

HONORS

Dr. Harry Krutter, chief scientist at the Navy's Development Center, has been presented the Distinguished Civilian Service Award, the highest honor which the Secretary of Defense can bestow on civilians, for "his outstanding scientific achievements in connection with the development of radar and electronic equipment . . ."

Edward F. Jones, assistant to the president of Convair, has been elected national chm. of the Public Relations Advisory Committee of the Aircraft Industries Assn.

William S. Clark, gen. supv. for administrative services, Temco Aircraft Corp.'s engineering dept., has been elected chm. of the National Aircraft Standards Committee of the Aircraft Industries Assn.

P. H. Scheffler of Westinghouse Electric Corp.'s Aviation Gas Turbine Div., was appointed chm. of the SAE Committee AE-3, Fluid Seal and Connection Design.

George A. Philbrick, treas. of George A. Philbrick Researches, Inc. of Boston, was presented a special award by the American Society of Mechanical Engineers "in recognition of his contributions in the field of analog computation, and its application to industrial process control."

Mrs. Charles J. Lowen, widow of the Administrator of Civil Aeronautics, was presented a posthumous award to her late husband of the Department of Commerce Gold Medal for Exceptional Service for bringing to the CAA an aggressive program, the chief objective of which was to achieve a breakthrough from conventional public air transportation to jet air transportation and to add materially to public safety.

Donald M. Thompson, an aeronautical engineer with the U.S. Army Chief of Transportation, has been named vice president for the southeastern region of the American Helicopter Society with headquarters in New York City.

Dr. Ernest P. Gray, a former Elmhurst, N. Y. scientist, has been awarded the William S. Parsons Fellowship of the Johns Hopkins Univ. on basis of his research in theoretical physics.

ADM. D. C. RAMSEY (USN, Ret.), vice chairman of Aircraft Industries Assn., is shown (left) receiving an "Elder Statesmen of Aviation" award from Dr. John Victory, executive secretary of National Advisory Committee for Aeronautics and chairman of National Aeronautic Assn's Elder Statesmen of Aviation Committee.

W. W. Lampkin, director of manufacturing, Aircraft Div. of Hughes Tool Co., has been elected national chairman of the Aircraft Industries Assn's manufacturing committee.

Three members of the Air Line Pilots Association have been named regional vice presidents of the International Federation of Air Line Pilots Associations: **W. M. Masland,** North Atlantic Region; **F. T. Sterling, Jr.,** South Atlantic Region; **D. L. Leonard,** Pacific Regional Air Navigation Region.

Ray W. Ireland, vice president-traffic administration of United Air Lines, retiring August 1, was elected honorary lifetime president of the Air Traffic Conference at a dinner in his honor in New Orleans.

TRANSPORT CHANGES

Dieter Friedrich, former DSM for Trans World Airlines at Nice, France, has been named district sales manager for Lufthansa in Switzerland.

Robert J. Doyle is new director of press relations for Northwest Airlines.

Braniff has named **Tom McBride** manager at Guayaquil, Ecuador.

C. J. Middleton, former Seattle DSM for United Air Lines, is now area sales manager for Pacific Northwest districts of Seattle-Tacoma, Spokane and Vancouver, B.C.

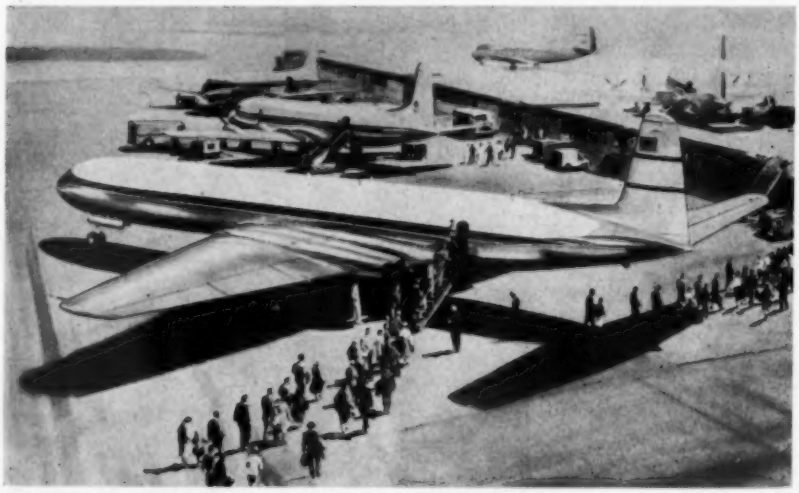
Harry G. Bishop, senior sales representative for BOAC at New York, has moved to the Washington, D.C., office.

Vickers undisputed leader in Europe

by Anthony Vandyk

PARIS—If this column reads a little strangely, it is not the champagne with which the aircraft salesmen have been plying their guests, but the exhilaration of seeing so many interesting aircraft and personalities in space of a few days.

A few hours after stepping from a Comet 3 at Amsterdam, I was inspecting a Tupolev Tu104 at the International Air Show here. In between, I was riding in a Convair 440 Metropolitan of Finnair, the Finnish airline, which is still officially known as Aero O Y. Less than 24 hours previously I was listening to the words of wisdom of Sir George Edwards, head of Vickers-Armstrongs Aircraft, and visiting the company's Weybridge plant where the Vanguard is fast taking shape. There is no question that Vickers, with 368 Viscounts sold and over 200 delivered, has established itself as Europe's No. 1 aircraft manufacturer.



BIG SELLING POINT being made by salesmen for British Comet and French Caravelle is that, unlike bigger jets, they will be able to operate from existing terminals.

At present, no less than 11 Viscounts are being produced each month at the Hurn and Weybridge plants. Sizable orders for the Vanguard and the jet VC-10 indicate that Vickers will be able to maintain this prominent position through the next decade.

Vickers owes much of its success in the commercial field to British European Airways, which has been the largest purchaser of both the piston-engined Viking and the Viscount. It seems, however, that following the BEA Vanguard order, the two organizations have come to a parting of the ways temporarily. For its jet program, BEA appears to be inclining toward the Comet 4B, sometimes called the Continental Comet, to tide it over until it can take delivery of a larger and faster model.

Indications are that the choice for the latter will be the Bristol 200 with four jets in twin pods at the rear, Caravelle-style. Such an order would be very welcome to Bristol, which will be faced with a difficult situation within two or three years unless substantial additional orders come in for the Britannia. It seems clear that if BEA buys the Bristol jet, several other European carriers will be bound to follow suit in order to meet the competition.

It was Air France's order for the Caravelle which started other European airlines shopping for short-range jets. At this writing, it looks as though SABENA will be the next customer for the twin-engine Sud-Aviation transport. The Belgian airline is also close to buying the Fokker F-27 Friendship. In return for this order, the Dutch manufacturer will give some F-27 subcontract work to SABCA, one of Belgium's two leading aircraft firms..

Cooperation between the European aircraft manufacturers is on the increase. Italy's Fiat is doing work for Sud-Aviation and, if it wins the NATO tactical support aircraft competition with its G-91, the Italian firm is likely to reciprocate by giving subcontracts to the French industry. On the other hand, as seems more likely, should France's Dassault company win with its Etendard, then Fiat would almost certainly receive subcontract work.

The Germans in their efforts to get going again in the aircraft field are working closely with the French, Italian and Spanish industries. German license programs, however, are running badly behind schedule. The only manufacturer in German actually producing is Dornier with its Do 27, STOL. This aircraft and Scottish Aviation's Twin Pioneer made particularly good impressions at the the Paris show because of their short takeoff and excellent climb performances. Helicopters were the subject of varying comments. One type was particularly criticized because of the marked vibration experienced by passengers. The French turbine-powered models drew the most praise.

These jottings on certain current European trends are being written to the accompaniment of loud noises in the vicinity. Maybe these are supersonic bangs from the Super-Mystere or the Dassault Mirage. But more probably they are more champagne bottles being opened. I had better investigate.

International Briefs

Lufthansa has not increased its domestic fares, although it has applied the IATA increases for international flights within Europe.

East African Airways will soon open a Nairobi-Aden-Karachi-Bombay service with Argonauts.

AMERICAN AVIATION'S Anthony Vandyk (right) and D-H's chief test pilot John Cunningham fly the Comet 3.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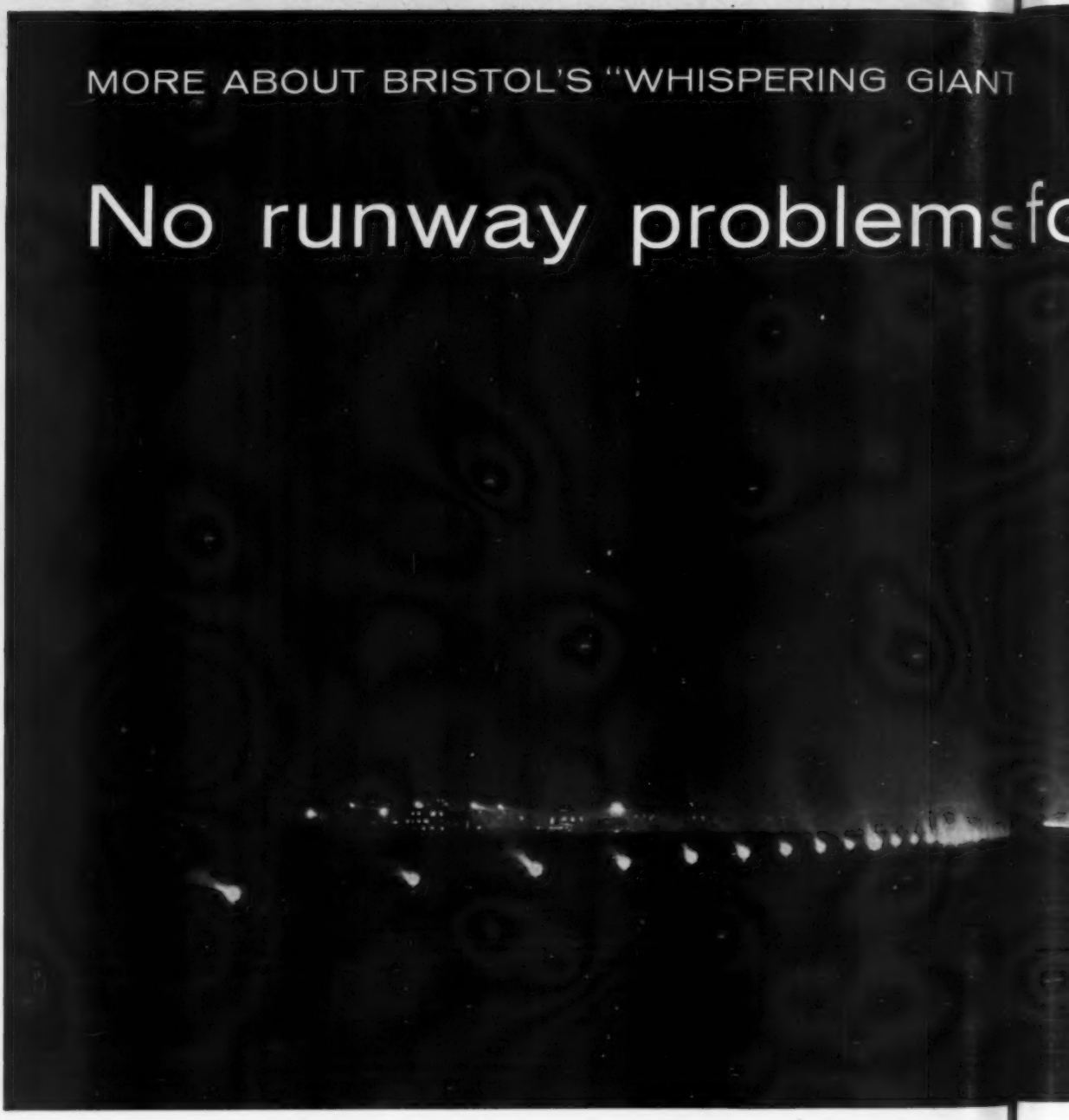
MORE ABOUT BRISTOL'S "WHISPERING GIANT

No runway problems fo



The brilliant new Bristol Britannia is the world's largest, fastest turboprop airliner ... yet operates from existing runways throughout the world.

From a 6,000-ft. runway, she will lift a 28,000-lb. payload plus enough fuel for a sector distance of 2,500 miles, with full allowances and reserves.

The Britannia is powered by four 4,120 horsepower Bristol Proteus engines, cruises at 400 m.p.h., carries up to 133 passengers at amazingly low operating costs.

She is the world's most versatile airliner because she maintains her matchless standards of efficiency and economy on an extremely wide variety of stage-lengths ... from the longest trans-polar flight to short inter-city runs. On all counts, the Britannia is years ahead of any other passenger aircraft.

She is now in commercial service with British Overseas Airways Corporation. Britannias have also been ordered by Northeast Airlines, Canadian Pacific Airlines, El Al Israel Airlines, Hunting-Clan Air Transport, The Royal Air Force and The British Ministry of Supply.

BRISTOL

Britannia

BRISTOL AIRCRAFT LIMITED, ENGLAND

for the Britannia

BOOKS

The Zeppelin in the Atomic Age. *By Edwin J. Kirschner. Published by University of Illinois Press, Urbana, Ill., 80 pp., $3.50.*

The author makes a strong case for redevelopment of lighter-than-air craft to fill the gap between slower ocean vessels and smaller airplanes. He sees zeppelins as vehicles offering the comforts of steamships at a fraction of the cost of air travel by plane. He also advocates use of rigid airships for aerial inspection of military facilities as proposed in President Eisenhower's open sky plan.

Included in the volume are comprehensive treatments of historical developments, the roles of the United States and international organizations in development and use of lighter-than-air craft. Economic considerations and engineering characteristics are also given thorough attention.—W. O.

The Central Blue: Autobiography of Sir John Slessor, Marshal of the Royal Air Force. *Published by Frederick A. Praeger, Inc., 150 East 52 St., New York 22, N. Y. 678 pp. Price $7.50.*

The author describes not only his personal career, but gives a complete history of the Royal Air Force through almost four decades. The story of its struggles and achievements during wartime operations is told with a rare thoroughness such as can only come from personal experience and intimate knowledge of wartime problems.

Handbook of Rockets and Guided Missiles. *By Norman J. Bowman. Published by Perastadion Press, 10630 S. St. Louis St., Chicago 48, Ill. 328 pp., Illustrated. Price, $6.50.*

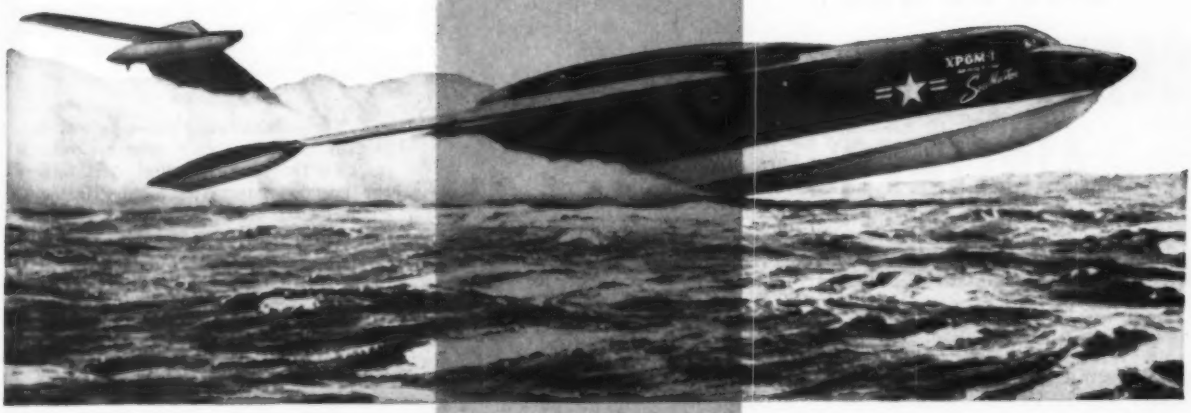
Drawing from a bibliography of 1,276 titles, the author has done a mammoth job of correlating and arranging much of the published data relating to the world's arsenal of missile weapons. Most of the information is correct, although there are minor lapses, such as crediting the Corvus to the Army instead of the Navy.

'Facts and Figures' for '57 off press; 5th annual issue

The 1957 edition of *Aviation Facts and Figures* is off the press and copies are available at $1 each from the publishers, American Aviation Publications, Inc., 1001 Vermont Ave., N.W., Washington, D. C.

This is the fifth annual edition of this official publication of the aircraft industry. It was prepared by the Aircraft Industries Assn., and comprises 120 pages of facts, gleaned from hundreds of aviation sources. This year's issue carries for the first time a complete list of information officials in the industry.

for Navy's new P6M SeaMaster...



Flight Control System—by Sperry

World's first multi-jet attack seaplane, the new 600-mph Martin SEAMASTER gives our Navy truly global striking power — oceans, lakes and bays become its indestructible runways; far-ranging submarines and tenders are its mobile bases.

As the fastest low-altitude attack aircraft in existence, the SEAMASTER poses special problems in flight control and navigation. For example, it may be sent one night on a low-level mine-laying mission, while the next day may find it at 40,000 feet on a photo-recon job.

To meet these varying requirements, the SEAMASTER is equipped with the advanced Sperry SP-30 flight control system, designed especially for high-speed, long-range multi-jet and turboprop aircraft. It provides precise automatic control of the big Martin plane at all speeds from landing to subsonic. And self-contained subsystems for the rudder, ailerons and elevators serve as dampers to aid the pilot during manual operation.

H. F. SEELS, Superintendent Aeronautical Field Service Engineering, has over 150 Sperry field engineers stationed at major military and commercial operational bases all over the free world.

Like the SEAMASTER'S SP-30, each Sperry flight control system is engineered for the specific job to be done. This individual approach to the control factors of each aircraft has earned Sperry systems a place on many of the world's leading airlines, on thousands of military aircraft and hundreds of business planes.

Sperry engineers can also help you find the right answer to your flight control problems. Write our Aeronautical Equipment Division.

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WEST COAST TALK

by Fred S. Hunter

When compulsory retirement hurts; Rube Wagner, 60, won't be able to fly a jet

IT SEEMS A PITY, really, that Captain R. L. Wagner won't still be around to fly the first DC-8 jet trip for United Air Lines. It would have added a dramatic flavor to the event. But he's due to quit flying on August 1 at the compulsory retirement age of 60.

Rube Wagner (yep, his first name actually is Reuben), is, so far as we are able to ascertain, the last of the pioneer airmail pilots still flying the airlines. By pioneer airmail pilots, we mean those who go back to the pre-airline days when the postoffice department operated its own mail service.

Rube began flying the mail—in Liberty-engine-powered, open-cockpit de Havilland planes—in 1923. He moved over to United when Boeing Air Transport, a predecessor, took over the Chicago-San Francisco section of the transcontinental air route from the government in 1927. With a flight log exceeding 30,000 hours, he's run the complete gamut of transport equipment from the "seat-of-the-pants" 100 mph de Havillands to the highly instrumented 350-mph DC-7s, and he has been a top pilot through it all. There would have been no doubt of his ability to make the final transition to the big jets, and it's too bad the calendar will deny him the opportunity.

Since we're on the subject of pilots, let's take a reading on another veteran of the skyways, Capt. Roland Low of Hawaiian Airlines. Pilots on HAL's short inter-island routes average a take-off and landing every half-hour. Capt. Low, with more than 18,000 hours' flying time in his 22 years' service with the company, has approximately 36,000 landings in his log. Can any pilot flying today top that record?

Highly successful results were produced in the initial test of the new Air Force supersonic upward ejection seat tailored for Convair's F-102A in a run at about Mach 1.03 on the high-speed Project SMART track operated by the Coleman Engineering Co. The pilot would have survived, was report. Tests on the mockup seat are continuing. Next for Project SMART, Lockheed's downward ejection seat for the F-104A. Later on this year, some of the capsule stuff.

This was the formal title of a paper prepared by a couple of the boys at Douglas, John L. Hess and Charles F. Lombard: "Theoretical Investigation of the Dynamic Response of Human Torso Under Large Vertical Accelerations." Unofficial translation: "What cooks when a guy pops out in an ejection seat?"

The Palmdale boom continues. Details are now being worked out for the establishment of a flight-test facility for Hughes Aircraft Co. at Air Force Plant 42, as the Palmdale jet test center is officially known. The jet flight load at Hughes is pretty heavy, since the company has the responsibility for flight-testing the fire control systems it makes, and the factory airstrip at Culver City is too close to too many rooftops.

Four of The Flying Tiger Line's new Model 1049H Super Constellations are true air freighters. No windows. The others are convertible freight-passenger configurations . . . Northrop Aircraft has started tooling for its T-38 jet trainer, although it has not started framing jigs yet. Northrop, incidentally, expects to accomplish considerable savings in tooling time on the T-38 by making use of epoxy plastic dies and fixtures wherever possible . . . Shortage of qualified helicopter pilots for the busy summer season appears to be caused by high-paying ($1,000 per month) four-month contracts offered by Canadian operators on DEW line and Timberline projects . . . North American Aviation's Fresno division calls its good housekeeping awards "Neat As A Pin" awards.

Hank Coffin at Whiteman Airpark still has the OX-5 Waco Jimmie Mattern flew in the "Hell's Angels" motion picture in 1927 and rents it out every now and then to movie or television people . . . A recent DC-7C reorder still unannounced carries the Santa Monica production line into the fourth quarter of 1958 and Douglas has still another reorder from a different customer about ready for signature . . . Convair is testing two windshield rain-clearing systems for the Model 880, one with nozzle exit co-planar with the windshield and one with the nozzle on the fuselage skin.

"TRIGGER FINGER" FOR SAC

Reliable protection is a *must* for Boeing's giant B-52, operational weapon of the Strategic Air Command. An Avco-Crosley-manufactured MD-9 fire control system—with dual radar and multi-weapon turret—provides deadly and almost completely automatic protection for the B-52.

This newest "stinger" is one of a long list of modern bomber defense systems produced by Crosley. And, looking to the future, Crosley scientists are constantly developing still finer protection for the aircraft of tomorrow.

Crosley offers complete facilities for research, development, and production of:

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ENGINEERS WANTED: For top-flight men, Crosley offers unusual opportunities to explore new scientific frontiers that lead to outstanding and rewarding careers. Write to Vice President of Engineering at Avco-Crosley.

CONTRACTS

Air Materiel Command has announced the following contracts:

International Business Machines Corp., $10,000,000, for manufacture of bombing navigation systems.

O. E. Szekely & Associates, Inc., $1,314,465, trailers for aircraft engines.

General Electric Co., $12,000,000, J79 engines.

Marquardt Aircraft Co., $1,659,909, testing RJ-43 ramjet engines.

Department of Commerce has announced the following contracts:

AiResearch Manufacturing Co., $1,115,999, auixiliary power units.

North American Aviation, Inc., $2,140,234, engineering, investigation and development for Army Ordnance.

Mine Safety Appliances Co., $1,130,471, helmets.

Allison Division of General Motors, $15,199,315, T56 engines for Lockheed C-130 transport.

Hughes Aircraft $14,195,373, aircraft and weapon control and fire systems.

Sikorsky Aircraft, $13,752,090, H-34A helicopters and spares.

Ryan Aeronautical Co., $9,225,849, aerial target drones.

Cessna Aircraft Co., $1,829,310, Army L-19E aircraft.

Lockheed Aircraft Corp., Palmdale, $2,314,000, additional facilities for jet production test site.

Standard Oil Co. (Indiana), $3,412,593, B-57 engine starter cartridges.

Bendix Aviation, Eclipse Pioneer Division, $1,600,562, indicators.

Bendix Aviation Corp., $1,645,074, KC-135 wheel and brake assemblies.

Hughes Aircraft Corp., $1,291,319, research and development for fire control system.

United Aircraft Corp., $1,127,140, pneumatic aircraft engine starters.

Carbide & Chemicals Co., $1,898,821 methanol.

Aeroil Products Co., $1,916,438, spray outfit for decontamination, cleaning and deicing.

E. I. Dupont de Nemours & Co., $1,623,430, methanol.

Avco Corp., Lycoming Division, $2,080,460, T53 engine development.

Sikorsky Aircraft, $2,717,000, H-19D helicopters.

Martin Co., $1,527,981, Matador TM-61B flight test.

Lockheed Aircraft Co., Marietta, Ga., $6,000,000 fabrication of modification kits.

Douglas Aircraft Co., Tulsa, Okla., $5,800,000, fabrication of modification kits.

Solar Aircraft Co., San Diego, Calif., $1,777,500, gas turbine generator sets.

Curtiss-Wright Corp., Electronic Div., Carlstadt, N. J., $1,032,526, technical services; $1,007,753, C-121C simulators, spare parts, special tools, test equipment; Wright Aero Div., Woodridge, N. J., $1,910,000, engineering for J65 engines.

Bendix Aviation Corp., Bendix Products Div., South Bend, Ind., $3,370,054, wheel assemblies and brake spare parts and data; Bendix Radio Div., Baltimore, Md., $3,028,809, depot maintenance of electronic equipment.

North American Aviation Inc., Fresno, Calif., $2,250,000, installation of advanced electronic equipment and IRAN of F-86D aircraft.

Republic Aviation Corp., Farmingdale, N. Y., $4,702,223, contract changes and specifications.

Oakland Aircraft Engine Service Inc., Oakland, Calif., $1,216,416 overhaul of R-2800-75/79 engines.

Dow Chemical Co., Madison, Wis., $1,185,200, facilities for production of aircraft extrusions.

The following contracts were announced through the Commerce Dept. They are USAF awards unless otherwise indicated:

Boeing Airplane Co., $50,000,000, follow-on contract for KC-135s.

Allison Div., General Motors, $7,573,500 and $26,202,750, production of J71 engines.

Link Aviation, $2,100,000, F-106A flight simulator trainers, including spare parts, tools and engineering data.

Bell Aircraft Corp., $1,500,000, YH-40 helicopters with spares, ground support equipment, etc.

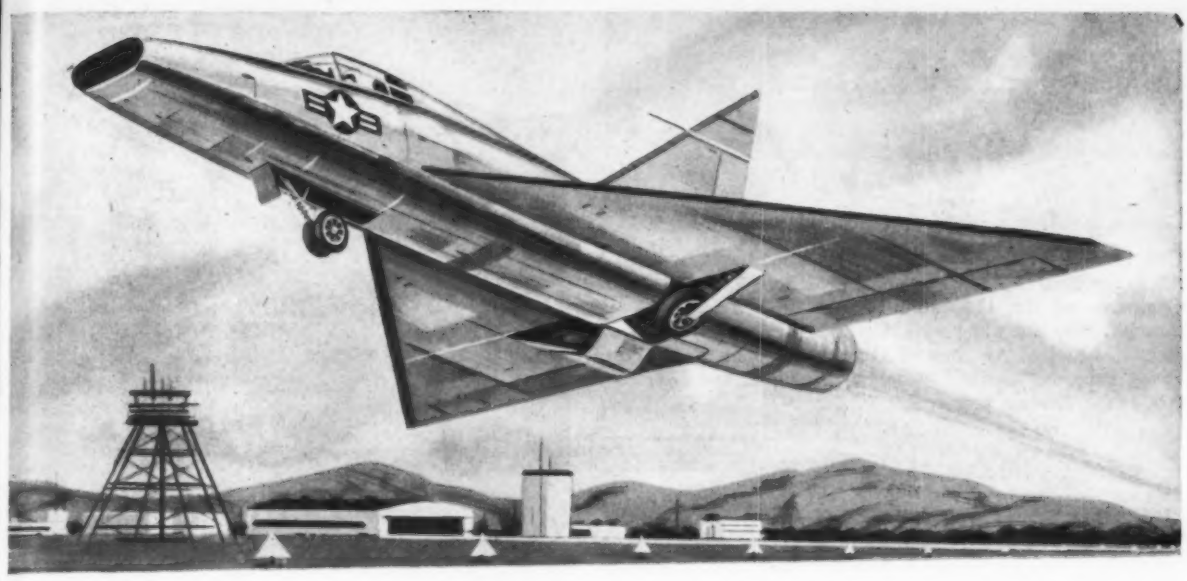
Arnolt Corp., Aeronautical Div., $1,102,151, aircraft hydraulic system test stand.

Craig Systems, $2,051,654, air traffic control equipment.

Flight Enterprises, Inc., $1,438,032 C-118A maintenance.

Philco Corp., $1,900,452, maintenance and operation AC&W sites, western, eastern AD forces.

Bendix Products Div., $2,456,137, fuel control assemblies.



PLUG-IN VALVE CUTS SERVICE TIME BY 95%

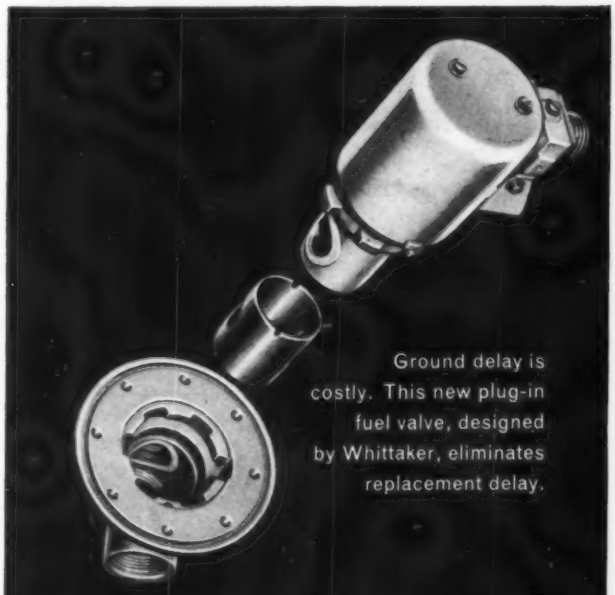
Because of its unique design, the Whittaker plug-in valve can be removed from an undrained tank, thereby eliminating fire hazard and the necessity of isolating the aircraft.

Also, the complete actuator assembly can be removed or replaced without disturbing any portion of the mechanism.

The secret of this new plug-in valve is a secondary seal incorporated within the unit—used only when the valve is removed and replaced. A partial turn on removal is all that is necessary to slide the seal into place in the housing. On installation, a reverse turn releases the seal and re-opens the line.

PERFORMANCE

TEMPERATURE.	Ambient, —65° F to +275° F Fluid, —65° F to +135° F
ELECTRICAL POWER.	115 volts 400 cycle single phase AC
PRESSURE.	Rated operating pressure 60 PSI. Max. internal leakage 10 DPM at 60 PSI
PORTS.	Per AND-10050-16.



Ground delay is costly. This new plug-in fuel valve, designed by Whittaker, eliminates replacement delay.

SEND THIS COUPON FOR COMPLETE INFORMATION

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Gentlemen: Please send me further information on the Whittaker Plug-in Type Rotary Shut-Off Valve, P/N 130035

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Company_____

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Whittaker

Wm. R. Whittaker Co., Ltd., 915 N. Citrus Ave., Los Angeles 38, Calif.

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Indianapolis
Wichita
Baltimore
Seattle

PEOPLE

Gen. Nathan F. Twining, (second from left) was honored by the Lotus Club at New York recently after he was designated Chairman of the U.S. Joint Chiefs of Staff effective this summer. Also attending were, left to right: Air Marshal C. R. Slemon, Chief of Air Staff of the Royal Canadian Air Force: Frank Pace, Jr., General Dynamics president, and J. Geoffrey Notman, Canadair president.

Lawrence A. Hyland (left), vice president and general manager of Hughes Aircraft Co., receives the Pioneer Award of Institute of Radio Engineers from Brig. Gen. P. C. Sandretto, USAFR, chairman of awards committee of IRE's Professional Group on Aeronautical and Navigational Electronics. Award was for demonstration early in 1930s that radio waves will reflect from objects.

Orval R. Cook (left), president of the Aircraft Industries Assn.; Donald G. Anderson, Director General of Civil Aviation for Australia, and James T. Pyle, Civil Aeronautics Administrator, confer following Anderson's recent talk to the Export Committee of AIA.

Capt. Dan Hughes, Jr. (left), System Chief Pilot for Braniff International Airways, has been named Director of Flight Operations. He is shown with R. V. Carleton, Braniff vice president-operations (center), and Capt. Ted Rains, Hughes' successor as chief test pilot.

BADE

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MANUFACTURING

Name	New Position	Former Position
Jack Bade	Dir. flt. operations, Republic Aviation	Asst. dir. flt. operations
Alexander Black	Exec. vp and gen. mgr., Weber Showcase & Fixture Co., Inc.	VP-sales
Robert S. Miller	Gen. mgr., Cal-Tronics Corp.	Plant mgr., Servomechanisms, Inc.
Anthony Del Duca	Chief electronics engr., Process Instruments Div., Beckman Instruments	Senior engr.
Walter H. Sieger	President, Revere Corp. of America	Gen. sales mgr., Neptune Meter Co.
Thomas E. Johnston	Gen. purchasing agent, Aerojet-General Corp.	In purchasing and subcontracting
W. F. Otterstrom	Comptroller, Olin Mathieson Chemical Corp.	Asst. to exec vp-finance
Richard W. Sanford	VP, dir. of engrg., Aircraft Armaments, Inc.	Chief engr. and dir. of engrg.
Harry F. Kniesche	VP-mfgng., Aircraft Armaments, Inc.	Chief of manufacturing
Robert C. Smith	Price redetermination admr., Temco Aircraft Corp.	Asst. project engr., Chance Vought
Arnold L. Rustay	Tech. dir., Eastern Div., Wyman-Gordon Co.	Dir. of research
Marion E. Cieslicki	Dir. of research, Eastern Div., Wyman-Gordon Co.	Mgr. materials engrg., GE-Evendale
Clarence C. Smith	Dir. engrg., Tranter Mfg., Inc.	Design and project engr., Duriron Co.
William B. Denniston	Sales mgr., Panelit, Inc.	Self employed
Jerome Zauderer	VP, Bruno-New York Industries Corp.	VP, Amic Mfg. Corp.
Peter J. Wacks	Asst. to pres. for ind. rel., Bell Aircraft	Asst. to exec. vp, Chance Vought
Dr. Russell R. Law	Dir. new product devel., Hughes Products Group, Hughes Aircraft Co.	Dir. R&D, CBS-Hytron div.
Albert E. Schwerin	Head test activity, Missile and Ordnance Systems Dept., Patrick AFB	Test engr.
Edgar Schmued	Member exec. comm., Northrop Aircraft	Corporate vp-technical
Fred H. Crank	VP-customer rel., Radioplane Co.	Washington office
Charles D. Manhart	Staff dir. military and govt. sales, Bendix Aviation Corp.	Gen. mgr., aircraft sect., Products Div.
Philip S. Hill	Exec. vp, Hyster Company	VP-sales
Rodney D. Chipp	Mgr. systems engrg., Radio Communication lab. of Federal Telecommunication Laboratories	Dir. engrg. for manufacturing divisions
Lester J. Henderson	VP-sales, Republic Mfg. Co. of Cleveland	Gen. sales mgr., Special Products Div., The Weatherhead Co.
Walter E. Bison	Admin. asst. to pres., Lycoming Division	Attorney
James P. Coughlin	Gen. sales mgr., Cushioning Products Div., Armour and Co.	Asst. to pres., Eutectic Welding Alloy Corp.
Louis G. Karagianis	Military relations engr., Semiconductor-Components div., Texas Instruments Inc.	Project engr., Wright Air Development Center
Maybelle Z. Mitchell	Pub. rel. coordinator, Dalmo Victor Co.	Editorial asst.
Don C. Atkins, Jr.	Asst. chief engr., U. S. Chemical Milling Corp.	Dir. R&D, Chemical Milling Div., Turco Products, Inc.
Allen J. O'Brien	Asst. dir. AIA's Traffic Service	Dept. of Defense
John V. E. Hansen	Bus. mgr., Research Div., National Research Corp.	In Research Div.
Andrew M. Monahan	Sales mgr., Precision Potentiometer Div., Waters Mfg., Inc.	Asst. sales mgr.
William W. Bartell	Gen. sales mgr., Precision Potentiometer Div., Waters Mfg., Inc.	Sales mgr.
James V. Lecocq	Pub. rel. mgr., Milwaukee plants, AC Spark Plug Div., General Motors	In pub. rel. dept.
Joseph R. Greer	Chief engr., Beckman & Whitley, Inc.	Project engr.
Perry A. White	VP and gen. mgr., Eddystone Div., Baldwin-Lima-Hamilton Corp.	Gen. controller and a director
Robert G. Tabors	VP and gen. mgr., Electronics & Instrumentation Div., Baldwin-Lima-Hamilton Corp.	VP and asst. gen. mgr., Hamilton Div.
R. Fred Buehring	In chg. contract admin., Temco Aircraft Corp.	Plant mgr., Greenville
W. A. Tweedie	Programming, Temco Aircraft Corp.	Plant mgr., Garland
J. A. Broadston	Mgr., service div., Rocketdyne Div., North American Aviation	Mgr. Rocketdyne's Propulsion Field Laboratory
James F. Stengel	Dir. ind. rel., Marquardt Aircraft Co.	Dir. ind. rel., Fairchild Engine Div.
James R. Cunningham	Sales mgr., Systron Corp.	Sales mgr., Systems Dept., Beckman Instruments
Robert W. Phillips	Chief engr., synthetics and plastics, R&D Div., Flexonics Corp.	Chief engr., Flex-O-Tube Div.
Earl Heppell	Chm. Bomarc change board, Boeing Airplane Co.	Change board chm., Wichita
Maj. Gen. Frederick R. Dent, Jr. (USAF, ret.)	VP, Electronics Corp. of America	Commander, Mobile Air Materiel Area
John W. Johnson	Dir. adv. and pub. rel., Chance Vought	Dir. advertising
John Innes	Editor in chief, Chance Vought pub. rel. and adv. dept.	Pub. rel. mgr.
Milton E. Chandler	Retired	Engrg. mgr., Chandler-Evans Co.
Gordon C. George	Mgr. sales, GE Flight Propulsion Laboratory Dept.	Lockheed Aircraft Corp.
Dr. Morris Rubinoff	Mgr. digital computer engrg., Philco's Govt. & Industrial Div.	Asso. professor U. of Penn.

AIRLINE

Douglas Stockdale	Gen. mgr. Mexico City, Western Air Lines	Mexico City, gen. mgr., TWA
Kenneth Parratt	Dir. passenger service, Pan American World Airways	Service mgr., Atlantic Div.
Budd M. Murray	Dir. flight operations, Hawaiian Airlines	Captain
Robert C. Hatch	Mgr. Braniff Airways in Panama	Mgr. in Ecuador
John F. Spear	Dir. personnel, Riddle Airlines	Personnel and methods consultant
Armando Perez Plasencia	VP, Compania Cubana de Aviacion	Asst. gen. mgr.
W. Braddock Hickman	Asst. vp-economic research, American Airlines	Dir. economic research
F. C. Wiser	Asst. vp-operations, American Airlines	Pittsburgh Standard Conduit Co.
A. E. Smick	Asst. vp-aircraft maintenance, American Airlines, Tulsa	Dir. aircraft engrg.
David E. Postle	Vp-research, Mohawk Airlines	Dir. research
Margaret H. Kreiling	Chief stewardess, Slick Airways	Admin. asst. to chief stewardess

SAM SAINT SAYS

Has the Curtis team loaded a big gun with wet powder?

THE LONG-AWAITED Curtis report is in. Boiled down to a single, shining essential, Mr. Curtis recommends the establishment of "an independent, Federal Aviation Agency" to "centralize the responsibility for policy, operations and modernization of this national service . . ." This is the most important thing that is new and different in the Curtis report.

This by itself would be enough. For this recommendation alone the Curtis report should become a milestone in the turbulent and explosively expanding aviation picture. Unfortunately, however, this common sense recommendation is relegated to the future. We must wait three years, says the report, to straighten out the maze of conflicting and overlapping areas of responsibility within the government. Proposed as a stepping stone toward the sensible plan for the future is a not so sensible three-year interim program.

The Curtis recommendation for the next three years calls for establishment of an Air Modernization Board to get started on development at once. A bill to clothe this recommendation with Congressional authority and presumably with sizeable sums of taxpayers' money is currently under discussion on Capitol Hill. On the surface the proposed Air Modernization Board seems a good way to get started on needed improvements. But on closer examination it appears the interim program may negate and eventually destroy the force of the Curtis recommendation for an independent Federal Aviation Agency.

The idea of an independent Federal Aviation Agency is not new, but the Curtis recommendation, coming as it does from within the federal government itself, is a refreshingly courageous self-appraisal to say the least. The need for establishing a single agency, having statutory authority, is well-documented by Mr. Curtis.

Important problem areas are highlighted. Problems of the vanishing airspace. Conflicts of military and civil interest. Modern jet giants appearing on the scene without airports from which to operate. The lack of automation in the face of an air traffic dilemma crying for automation.

Mr. Curtis has added new stature and a hard core of common sense in restating aviation's often repeated troubles. And he has done more. He has found and nailed to the barnyard wall the underlying cause of the spinning wheels and the ineffective and frequently self-cancelling efforts of the past. With simple honesty, the President's assistant has blamed the "diffusion of interest and responsibilities" which he believes "has deterred executive branch policy making and execution of programs, as well as creating unnecessary difficulty for Congress . . ."

Taken in its entirety the Curtis report is a fine and solid job of work. We could argue the wisdom of bringing the CAB rule-making and accident-investigating functions into the new Federal Agency. But these points hardly detract from the solid sense of the overall report.

On the other hand, the interim recommendation for the immediate three-year future does not seem to be cut from the same cloth. Perhaps the Secretary of Commerce was reluctant to agree to the immediate amputation of the CAA from the Commerce Department. Perhaps Mr. Curtis went as far as he could in recommending the independent Federal Agency for three years hence, when we will have a new President and possibly some new cabinet members.

Whatever the reason for recommending an interim Air Modernization Board, we are faced with the probable enactment into law of a program that: (1) promises nothing to help the CAA handle what the Harding Committee declared to be an emergency situation; (2) sets up an agency separate and apart from the CAA, the operating agency, to "be responsible . . . for the systems engineering, the evaluation and selection of such aids as will best serve the needs of aviation," and (3) sets up a confusing duplication of ACC functions by charging the new AMB with responsibility "for developing and consolidating requirements for future systems . . ."

This is a reincarnation of the Air Navigation Development Board at a higher level. All of the confused agency relationships that have prevented the ANDB from working effectively remain in the new AMB recommendation.

Mr. Curtis stands today at the peak of his potential to straighten out the mess we are in. After three years of higher-level confusion and three years more of passing the buck to CAA for the handling of the emergency situation—it is difficult to see how the 1957 recommendation for an independent Federal Agency will carry much weight in 1960.

THE BULLETIN BOARD

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FACILITIES

Standard Pressed Steel Co. will build a 55,000-sq.-ft. addition to its main Jenkintown, Pa., plant. The $750,000-building will enable SPS to enlarge research and development laboratories. Completion is slated for next year.

Babcock Radio Engineering, Inc. has opened a new facility at Costa Mesa, Calif. The 25,000 sq. ft. of plant area provides for consolidation of all Babcock divisions.

Darco Industries, Inc. has acquired controlling interest in Demco-Haines Tool Corp. All manufacturing activities of the company will be at El Segundo, Calif. Demco-Haines was located at Enid, Okla.

Bristol Co. has opened a branch factory and repair laboratory in Los Angeles. Facility will be managed by J. W. Peckham. Bristol now has branch facilities at Los Angeles, Houston, Chicago and San Francisco in addition to the main Waterbury, Conn., factory.

American Electronics, Inc. has broken ground for an 11,000-sq.-ft. environmental test laboratory. Completion is scheduled for August.

ACF Industries, Inc. has established an Advanced Products Division. Personnel and facilities of the ACF plants at St. Charles, Mo., and Milton, Pa., are assigned to the division and Rudolph Furrer, ACF vice president of manufacturing and engineering, is president.

Belock Instrument Corp. has broken ground for an Engineering Center at College Point, Queens, N. Y. The new research and development facility will be housed in a 30,000-sq.-ft. building.

Boeing Airplane Co.'s Transport Division will build a facility for testing company-developed jet engine sound suppressor-thrust reverser equipment. The $300,000 facility wil be adjacent to Boeing's Renton, Wash., manufacturing building.

Reynolds Metals Co. has dedicated a facility addition at its McCook, Ill., plant for the production of wings and other aluminum components for military and commercial aircraft.

Ryan Aeronautical Co. has acquired an assembly plant and 270-acre site adjacent to the Torrance, Calif., Municipal Airport. The facility helps fill requirements for more assembly space for commercial and military products.

Standard Pressed Steel Co. will build a 55,000-sq.-ft. addition to its main Jenkintown, Pa., plant to increase production of precision fasteners. New building will cost $750,000 and is expected to be occupied in 1958.

Arwood Precision Casting Corp. has purchased Duncan-Rohne Co. and Malco Metal Products Co., both of Hollywood, Calif. Both companies will continue to operate as Arwood subsidiaries.

Parker Aircraft Co. is building a $600,000 addition to its Los Angeles plant. The 30,000-sq.-ft. building will be completed July 1.

The W. L. Maxson Corp. has opened a Florida District office at 6 Perry Blvd., Ft. Walton Beach, to supply liaison service to military activities in the Gulf Coast area.

California Duplicating Co. has assumed administration of Aircraft Hinges, Inc. The company will integrate facilities to produce aircraft parts and assemblies.

Physical Measurements Corp. has been formed to provide instruments and systems to measure basic physical phenomens. Headquarters are at Santa Monica, Calif.

Stanford University this month will begin construction of a 20,000-sq.-ft. addition to its Science Quadrangle. A new wing to the electronics laboratory and an applied electronics laboratory will be constructed.

HRB-San Diego Laboratories, division of Topp Industries, Inc., has opened a research and development facility at San Diego.

Northrop Aircraft, Inc., will move its corporate headquarters from Hawthorne to Beverly Hills, Calif., about May 1. Northrop's general offices will stay at Hawthorne.

Autonetics Division of North American Aviation is expected to complete occupancy of its new headquarters building at 9150 E. Imperial Highway, Downey, Calif., by late this month.

Ramo-Wooldridge Corp. has completed a new facility for reduction of telemetered test data at Los Angeles. The unit was designed and built by the company's Electronic Instrument Division, will be used by the Guided Missile Research Division.

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Ford Instrument Company's new Missile Development Division is expanding because of increased activity on guidance and control work for major ballistic missiles such as the Redstone and Jupiter.

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ADVERTISERS' INDEX

EN ROUTE

by Wayne W. Parrish

Before the storm broke on Formosa

MY TWO-DAY VISIT to Formosa took place early in March, long before the jolting anti-American riots that took place later. At that time I was under the impression that Formosa would be the last spot where such an outburst could take place, but I am at best a very superficial observer of non-aviation affairs around the world.

Did you know that there are (or were) 10,000 Americans on Formosa in addition to some military units? I didn't, but the riots pinpointed the fact that the U.S. has far too many Americans stationed overseas. I feel pretty violently on this topic. There is no possible or conceivable justification for having *ten thousand* on Formosa. One of these days I'm going to write some stuff on Americans stationed overseas. (There are 794,000 of them.) Suffice it to say that in my opinion a lot of unnecessary ugly situations develop because of our flaunting of American "prosperity" and standards of living on other countries.

But when I was in Taipeh in March on an all-too hasty visit, everything was sweetness and light. And I was royally entertained. Having come from Scandinavia over the North Pole to Japan, and then arriving in a Chinese land, I was getting the Dulles treatment of hopping from one atmosphere to another with hardly enough time to launder my shirts at night. (Except I doubt that John Foster D. has to wash out his own shirts.)

ARRIVAL AT TAIPEH: Left to right, C. J. Rospert, v.p. of CAT; Hugh L. Grundy, president of CAT; WWP, and Brig. Gen. Benjamin G. Davis, Commanding Officer of the 13th USAF.

FIGURE THIS OUT FOR YOURSELF: The menu for the luncheon at the Chinese Air Force Officers' Club, Taipeh, at which General "Tiger" Wang was host. Both General Wang and his vice chief signed WWP's card.

Beautiful women? Wonderful food? I found both in Taipeh. On my last night I was guest of honor at a very plush reception and dinner provided by Hugh Grundy, president of Civil Air Transport, that embattled airline that began with Claire Chennault on the mainland and is now operated for the Nationalist Chinese on Formosa.

The affair took place in the very swank Golden Dragon restaurant attached to the Grand Hotel. I made the best deal I could with the traveling clothes I was wearing and stood in the reception line to meet a long line of civil and commercial aviation folk.

Then came a dinner that would take your breath away. Just as in Japan I had to pass up the seafood courses but there was enough left over for a six-months' supply on a deserted island.

Just look over this list: First came an assorted cold dish, then a course of fried sliced prawns, followed by fried chicken with red pepper sauce (nice and hot), then grilled sliced ham, then shark's fin with stewed chicken, followed by a course known as "eight precious pigeon," another course of sliced chicken with mushroom, another course of smoked pomfret, another course of steamed ham and chicken soup (delicious, it was), followed by sweet fancy mashed prunes, and topped off by sweet silver ear soup.

That adds up to eleven courses. The service was de luxe throughout. The conversation was gay. About half the guests were Chinese, the other half American. And in the group were several of the most beautiful women I have ever laid eyes on. Chinese, of course, and beautifully gowned. Man and boy, there are times when I wished I hadn't just passed my 50th birthday and were about 25 again.

Then there was another unusual occasion. Thanks to General Benjamin O. Davis, who was then commander of the 13th Air Force, USAF, but who will become Chief of Staff of the USAF 12th Air Force at Wiesbaden, Germany, next month, I got invited to a very special luncheon at the Chinese Air Force Officer's Club.

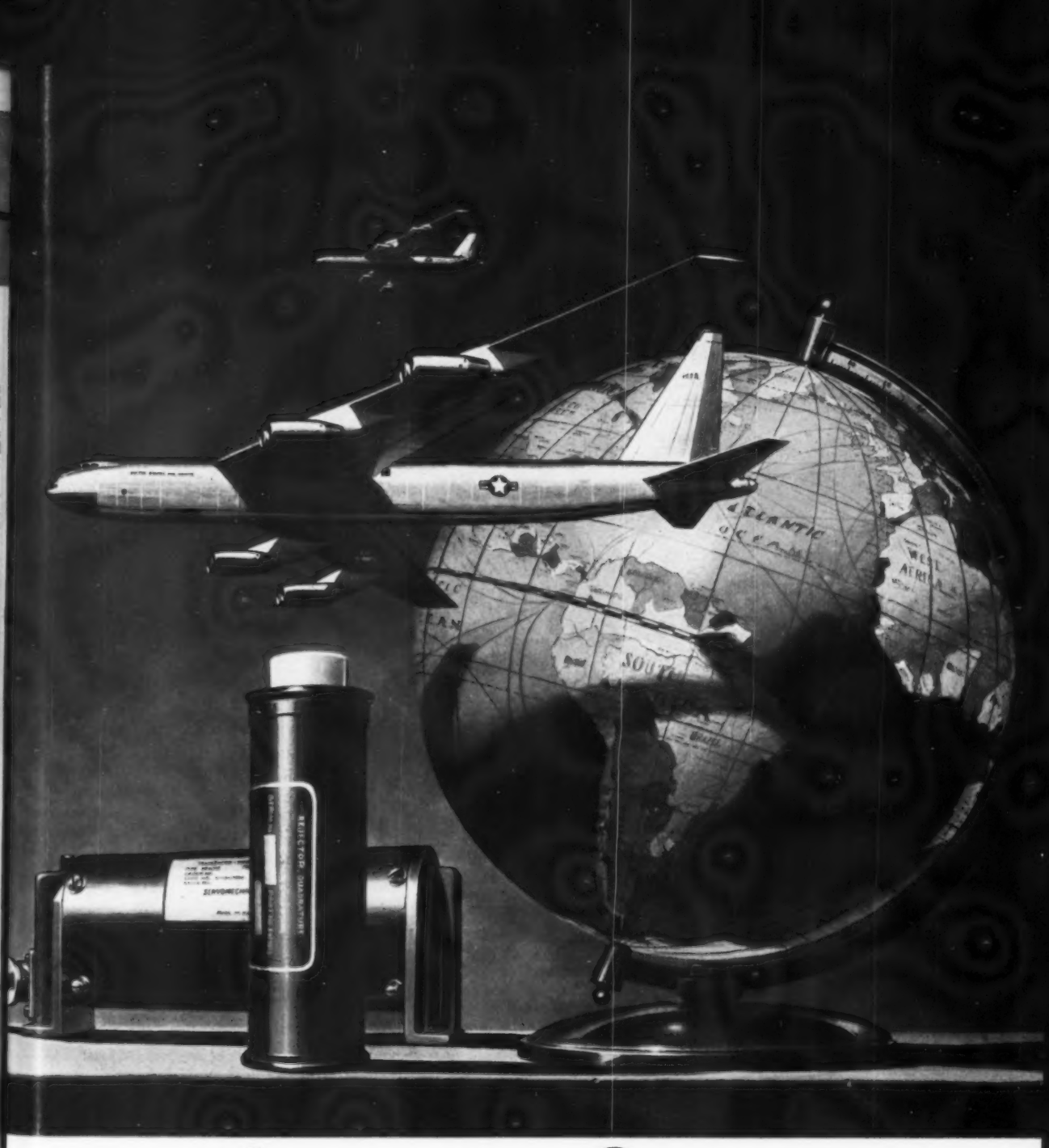
It happened that General Wang Shuming, the famous "Tiger Wang," chief of the Chinese Air Force, was honoring Maj. Gen. Harold S. Grant, the outgoing Deputy Commander of the U.S. Taiwan Defense Command. It was quite a formal but gala affair and I was the only civilian in the sea of Chinese and U.S. uniforms. Fine lunch.

On the first evening in Taipeh I had a drink with General Davis and his attractive wife at their home, and then we proceeded to the Grand Hotel Recreation Club for dinner. I was much impressed by General Davis, a six-footer who is the only Negro general in USAF. I'm glad to see him boosted to the new 12th Air Force in Europe.

At the CAT party I was very happy to meet again the famous Moon Chin who will be remembered for his operating the CATC airline on the Chinese mainland before the Commies took over. Still as boyish-looking as ever, Moon Chin and his partner Harvey Toy operate a small internal service called Foshing Airlines with C-46s and C-47s. I had met Moon Chin in Shanghai back in 1947 when I was out there with the first Northwest Airlines survey flight. He has changed less than anyone I've seen in a long time.

Ran into an old friend by name of Frank A. Huntley, who left Northwest Airlines not long ago to become associated with the Taiwan Trading Corporation. Huntley had promised to show me some of the night spots but I confess that for once in my life I was too tired to accept. My sociological observations of Formosa will have to await another trip. Understand there are some mud baths worth exploring.

Huntley was succeeded by Joe Sykes as NWA district sales manager and Joe was on hand several times during my stay and took me to the airport to catch a Northwest DC-6B for Hong Kong. For a long time Northwest was handicapped by poor equipment but now with some DC-6Bs available it has picked up business impressively through the whole Far East network. I found considerable praise for NWA in Japan, Formosa and Hong Kong ever since the new equipment gave the airline a shot in the arm.



Intercontinental Peacemaker

Long arm of SAC's deterrent force, Boeing Airplane Company's intercontinental B-52 has as its nerve center the AN/ASB-4 Bombing/Navigation System, developed and produced by International Business Machines for the United States Air Force.

Aside from pinpoint navigational and bombing accuracy, this complex system is notable for a high level of reliability achieved by painstaking care in detail design, rigorous proofing of each part, and a system configuration comprising unit-tested modules.

Servomechanisms, Inc., in addition to quantity production of the Pressure Transducers and Quadrature Rejector units which are important input and control elements of this system, has also contributed to the development of several other important elements of this system.

SERVOMECHANISMS SMI INC.

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Fulcher Armstrong, pioneer airman, now owner of the Wichita Falls Air Transport Company which operates the municipal airport.

Built his first plane himself... now he rides herd on one of Texas' busiest airports

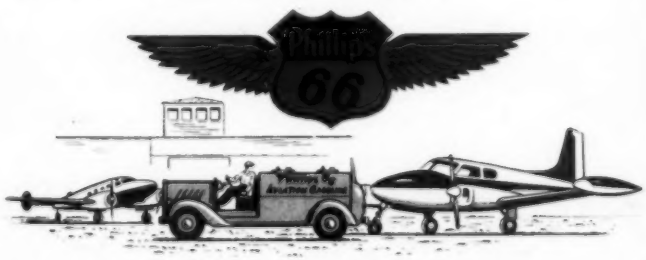
Two major air lines, Braniff and Continental, are served by the Wichita Falls Air Transport Company.

Home on the range: Private aircraft from all over the Southwest enjoy the complete line service offered.

Back in the early days of flying, Fulcher Armstrong built his own airplane and flew it successfully. Later he was one of the first to visualize the advantages of using airplanes in the ranching business and commuted from Wichita Falls to ranches in New Mexico. In 1927 he built his own airport to accommodate his aircraft. Three years later, the city of Wichita Falls asked him to convert his facility to a municipal airport. Beginning with this small operation, Mr. Armstrong has built it into one of the finest airports in the Southwest.

At present, the Wichita Falls Air Transport Company offers, on a 24-hour basis, complete line service for private planes and airliners; major and minor repairs on all types of planes up to and including Convairs; charter and ambulance flights, and radio repair. In addition, Armstrong's company operates a pipe line patrol and a flying school.

Phillips 66 Aviation Gasoline is used exclusively. "We find that Phillips 66 gasoline gives dependable performance. That's what counts with our customers," Mr. Armstrong says.



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